Medical Lib.
AUG 13 1928

SERIES 3, Vol. 11, No. 8 AUGUST, 1928

AMERICAN JOURNAL OF OPHTHALMOLOGY

CONTENTS

Original Papers	Page
Fundus conditions requiring differentiation from intraocular tumor. Ralph I. Lloyd	599
Endothelioma of the orbit. Leo L. Mayer	617
Radium therapy in vernal catarrh. Frederick C. Cordes and Warren D. Horner	622
Test letters which comply with the physiological requirements of a visual test object. Alfred Cowan	625
Acute rise of tension following the use of adrenalin in glaucoma. S. R. Gifford	628
Diagnosis and treatment of incipient glaucoma. R. J. Curdy	632
The management of established glaucoma. Edwin N. Robertson	638
Society Proceedings. United Kingdom, Chicago, Nashville, Puget Sound	641
Editorials	654
Obituaries	658
Book Notices	660
Abstracts	665
News Items	633

For complete table of contents see advertising page V

Copyright 1928, Ophthalmic Publishing Company, 7 West Madison Street, Chicago.

Subscription twelve dollars yearly. Single number, one dollar twenty-five cents.

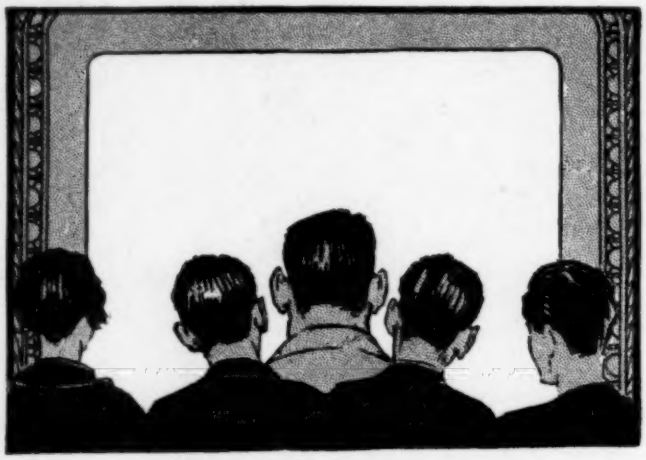
PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

PUBLICATION OFFICE: 450 AHNAIP STREET, MENASHA, WISCONSIN

EXECUTIVE OFFICE: 7 WEST MADISON STREET, CHICAGO, ILLINOIS

EDITORIAL OFFICE: 530 METROPOLITAN BUILDING, DENVER, COLORADO

Entered as second class matter at the post office at Menasha, Wisconsin



Down in Front!

IT TAKES ALL KINDS of people to make up a world, and perhaps oversize folks are necessary in the scheme of things. They are surely a nuisance to the rest of us, though, when they come between our eyes and the movie screen.

So it is with bifocals. Large segments are needed for special uses; desk work, figure checking, reading, drawing, studying, etc.; in fact many occupations demand special bifocals in which the reading area may even exceed the distance in size.

But for the average case, refractionists are pretty well agreed that bifocal segments are, mostly, too large. A prominent Los Angeles practitioner states:

"My office has given the size of the segment a great deal of thought and has arrived at the following conclusions: (1) that in 80% of cases requiring bifocals, patients may be fitted with segments 15 mm or less in diameter, thus cutting prism displacement to a minimum; (2) that if made larger, the segments are a handicap and a detriment except in special cases where much reading is essential or the vocation requires special handling; (3) that the size of the segment should be governed, to a large extent, by the pupillary distance and the size of the pupils."

NOKROME 16 QUALIFIES

NOKROME 16
has a small segment,
is entirely free from chromatic aberration,
gives extreme clarity of vision,
and completely invisibility of division line.

Order Nokrome 16 on your next bifocal Rx. You will be pleased and so will your patient.

RIGGS OPTICAL COMPANY

QUALITY OPTICAL PRODUCTS

Appleton, Wisconsin
Boise, Idaho
Butte, Montana
Cedar Rapids, Iowa
Chicago, Illinois
Council Bluffs, Iowa
Davenport, Iowa
Denver, Colorado
Des Moines, Iowa
Eugene, Oregon
Fargo, No. Dakota
Fond du Lac, Wisconsin
Fort Dodge, Iowa
Galesburg, Illinois
Grand Island, Nebraska
Great Falls, Montana
Green Bay, Wisconsin
Hastings, Nebraska
Iowa City, Iowa
Kansas City, Missouri
Lincoln, Nebraska
Los Angeles, California
Madison, Wisconsin
Mankato, Minnesota
Medford, Oregon
Minneapolis, Minnesota
Minot, No. Dakota
Oakland, California
Ogden, Utah
Oklahoma City, Oklahoma
Omaha, Nebraska
Pittsburg, Kansas
Pocatello, Idaho
Portland, Oregon
Pueblo, Colorado
Quincy, Illinois
Reno, Nevada
Rockford, Illinois
Salem, Oregon
Salt Lake City, Utah
Salina, Kansas
San Francisco, California
Santa Ana, California
Seattle, Washington
Sioux City, Iowa
Sioux Falls, So. Dakota
Spokane, Washington
St. Louis, Missouri
St. Paul, Minnesota
Tacoma, Washington
Walla Walla, Washington
Waterloo, Iowa
Wichita, Kansas

UNIV. OF MICH.

FUNDUS CONDITIONS REQUIRING DIFFERENTIATION FROM INTRAOCULAR TUMOR

FIG. 1. ANGIOMATOSIS RETINAE IN A BOY OF SIX YEARS. (RALPH I. LLOYD)

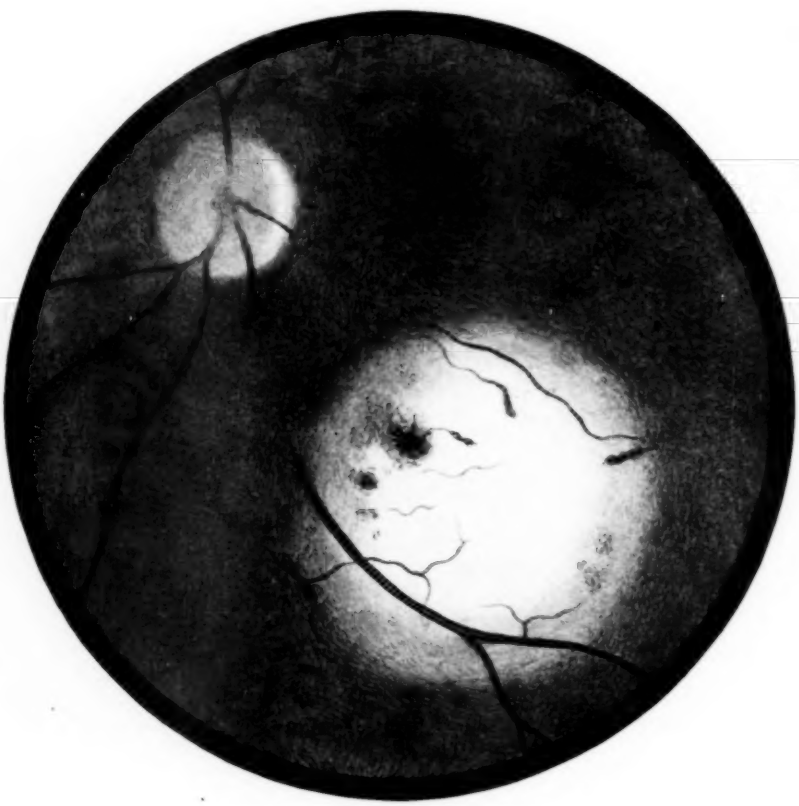


FIG. 2. TUBERCULOMA OF CHOROID. (RALPH I. LLOYD)

PLATE 6

AMERICAN JOURNAL OF OPHTHALMOLOGY
Volume 11 August, 1928 Number 8

FUNDUS CONDITIONS REQUIRING DIFFERENTIATION FROM INTRAOCULAR TUMOR

Angiomatosis retinae; retinitis exudativa; angioma of the choroid; vessel communications and aneurysms; tuberculosis of the choroid; cyclitic membranes; hyaloid remains

RALPH I. LLOYD, M.D., F.A.C.S.

BROOKLYN

These various intraocular disorders, which, either in their primary manifestations or after the fundus picture has become obscured by secondary developments, may suggest the existence of intraocular malignancy, are discussed seriatim from the point of view of differential diagnosis and as to their literary history. Some personal cases are reported, historically significant illustrations from the literature are reproduced, and the monograph is supplemented by ample bibliographies under the respective heads. (In addition to the text illustrations, see the colored frontispiece, containing a drawing of the author's case of Hippel's disease and a drawing of a large choroidal tuberculoma.)

There are two types of case appearing before the ophthalmologist in which a diagnosis of the condition is often impossible because a thorough examination of the fundus is impossible. The first type is that seen in a young child with a white reflex or a retinal detachment. The second is found in an eye with opaque lens and glaucoma, either in an adult or a young person.

It is usually taken for granted that the most common cause for these two entities is an intraocular tumor. It is quite proper to remove a blind eye when there is doubt as to the cause, but we have too frequently overlooked the fact that there are a goodly number of diseases or abnormal conditions that simulate tumor and that regularly produce an opaque lens and eventually glaucoma; and this is the outcome of the case in young children as in adults.

The rule that the blind eye is to be sacrificed to relieve pain or the menace of a malignant growth is surely sound, but an eye with secondary cataract but retained light perception, even if the projection is faulty, should never be considered a blind eye. Modern apparatus like the slit-lamp and the very strong transilluminating lamps should help us to better diagnoses in these puzzling cases and also to determine whether a blind eye may safely be retained.

The reason why the group of diseases discussed here is not better known is because it has not been the general habit to subject enucleated eyes to systematic pathological examination. For some years, a very general effort has been made to obtain autopsies in all cases dying with doubtful diagnoses, and this praiseworthy effort to improve the service at the disposal of the sick should be paralleled by oculists. This article may be construed as an earnest plea for routine examination of every enucleated eye as a matter of regular procedure rather than an exceptional matter.

We have been very slow to accept tuberclosis as a frequent cause of choroidal, cyclitic and iridic inflammations, but mainly through the help of the slit-lamp we are beginning to realize that many of the cases attributed to focal infections and others with etiology unknown are really tuberculous.

The white reflex in the blind eye of a child has always meant tumor, and the blind eye of a young person with elevated tension could be considered as nothing else.

Without in any way altering the safe and sane habit of protecting the patient

when in doubt in cases of this general group; without objecting to early removal of such eyes; but earnestly advocating thorough examination after removal, it has seemed worth while to review the conditions that may be mistaken for tumor and detail the value of the slit-lamp and of transillumination with powerful light in diagnostic dilemmas.

The slit-lamp will reveal deposits on the posterior surface of the cornea too fine to be picked out otherwise, and these signs of uveal disease may be present without a trace of circumciliary redness. In this way, inflammatory processes of very low grade but with very serious possibilities for the eye may be diagnosed when the lens is opaque or the pupil occluded. The cause of the inflammation cannot be told in this way unless the characteristic nodules on the iris edge indicate tuberculosis.

These nodules have acquired an almost pathognomonic import and occur with more or less deposit on the posterior corneal surface in the acute stages of tuberculous iritis, iridocyclitis, and tuberculoma of the choroid. The absence of circumciliary injection should not influence the observer to withhold his slip-lamp examination, because these nodules have been found repeatedly without the slightest ciliary redness.

We have then in the slit-lamp an instrument of great use in examining eyes into which we cannot look. The slip-lamp beam is very useful to throw a strong ray of light into the interior of eyes with retinal detachments or tumor masses, and especially in cases of large hemorrhage into the vitreous. This strong beam of light should be thrown into the eye with the pupil dilated, and the observing eye should look into the eye alongside the beam. This is the only way one can positively show the presence of large masses of blood in the vitreous. When this very strong but very narrow beam strikes the blood mass which smothers the ordinary reflex at the place of impact, the red color of the blood can be clearly seen. Detachments examined in this way sometimes show a dark mass beneath, or the presence of fluid, or the movement of the detached retina, or its absence may show very clearly.

Transillumination is often neglected, but is of great use to the examiner if strong enough light is used. It is generally believed that blood in the interior of the eye will not smother the light. If there is enough of it and it solidifies somewhat, the effect is to thoroughly darken the interior of the eye. This has been well shown in two cases recently under observation. Both were of eyes injured many years before and in a state of absolute glaucoma. Section showed total detachment, with the eye filled with dark red organized clot, but no growth in either.

The most important information we can obtain from transillumination when the pupil is occluded or the lens opaque is whether or not the retina is detached. Such eyes are a menace, and, if we find an absence of the black line just behind the ciliary region which indicates the ora serrata, the eye should be removed. The amount of light for transillumination varies with the case. In many cases, the very modest lamps fed by dry cells or a three volt current are enough. But very strong lamps are necessary in many cases, and here the question of elimination of heat is most important.

The Sachs lamp is too well known to need description, but better even than this is a similar cone of glass provided with a copper screen to lead off the heat and used with a 1,500 c.p. arc lamp. With this powerful lamp the ora serrata shows well, if present. As a dernier ressort, in cases with clear pupil and a suspicion of tumor far back in the globe, the Hertzell water-cooled lamp introduced into the pharynx will throw light into the orbit from behind, and a tumor mass will be well shown. These methods of examination are at the disposal of all. If they are utilized to full advantage, no fewer eyes will be removed but, on the contrary, more.

The manner of approaching the patient will differ as we more surely appreciate that there are many other very good reasons for removing an eye than intraocular growths. Routine pathological examinations of enucleated eyes give new light upon many conditions and explain many near mysteries. Besides adding a group of nonmalignant conditions that simulate tumors, detach the retina, and eventually bring about absolute glaucoma, we shall be impressed with the soundness of the old rule that a blind eye is always a menace.

The explanation why a large white mass in the fundus is common to several diseases is another by-product of study of this group of diseases. While we often think the white or soft yellow-white color is the specific color of the growth, as a matter of fact, the most common cause of this effect is detachment of the retina by fluid or organized exudate which eliminates the red color of the fundus derived from the choroidal blood vessels and throws back to the observer many of the rays of light from the ophthalmoscope unaltered by blood in quantity.

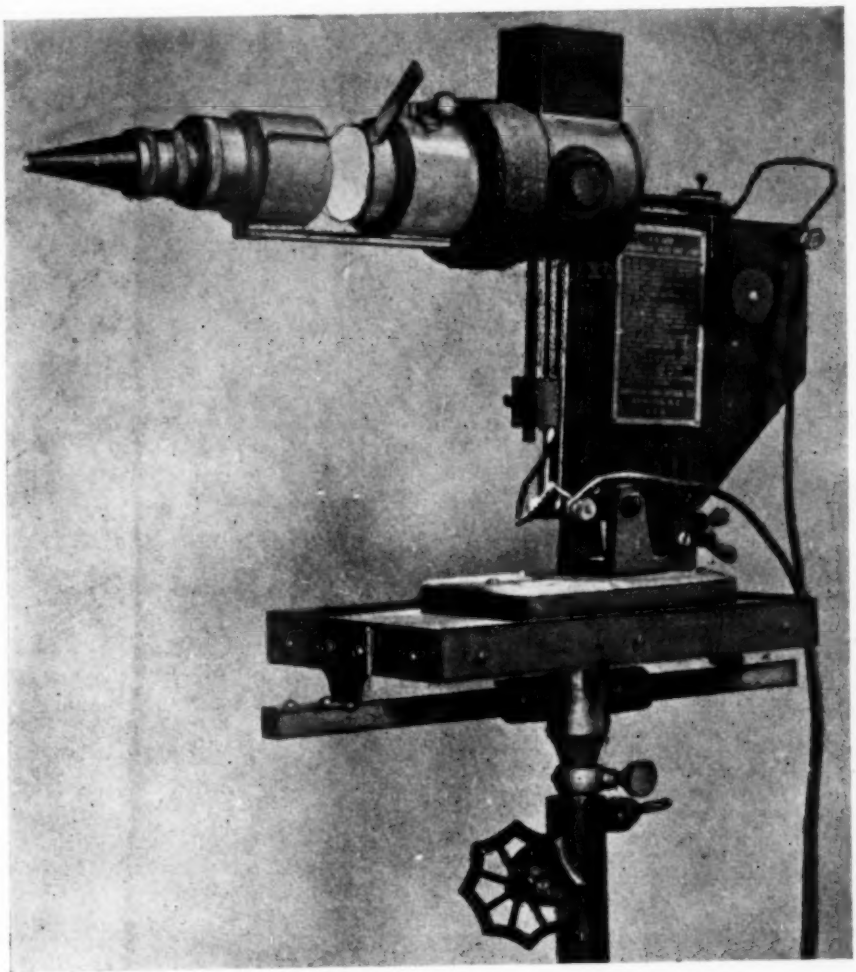


Fig. 1 (Lloyd). Transilluminator made by combining 1,500 c.p. automatic feed arc lamp and cone provided with copper screen. By replacing the transilluminating cone with a cell holding eiroviridine and copper sulphate solution, red-free light is available for fundus examination.

Sooner or later, in nearly all the diseases here grouped and in many others also, fluid, or blood which later loses its specific color, lifts the retina from the tumor or other mass which may be found in each of the important diseases included in our present review. In some growths with much pigment, like melanosarcoma, the specific color of the tumor may at times be very plain, especially when, early in the disorder, there is but little fluid between the growth and the retina.

Fig. 2 (Lloyd). Angiomatosis retinæ. Czermak-Ulbrich case in 1897. (From Archiv für Ophthalmologie, 1911, vol. 79.)

Angiomatosis retinæ or Hippel's disease

At the Heidelberg Ophthalmological Congress of 1904, Hippel presented a patient with a fundus picture that no one present had apparently seen before. The next year Czermak presented a similar case; but seven years elapsed before absolute glaucoma required the removal of these two eyes. Both eyes were promptly examined, but Czermak died before the completion of his task, and the material upon which he had been working was turned over to Hippel by Czermak's widow.

Hippel reported his findings in 1911, sixteen years after the first symptoms had appeared. The reports stated that the condition had hitherto not been noted, but it seems strange that no one realized for several years that such a striking picture could hardly have escaped the eyes of such clinicians as Fuchs, Treacher Collins, and the Hutchinsonian group. Some time after this report was made, the article and very excellent plate of Fuchs's case reported in 1882 and that of Collins and Wood of 1892 and 1894 were brought to general notice. Other observers have since reported cases, until the total number of cases reported to date amounts to about sixty, with microscopic examination in about a half of them.

The first title bestowed was Hippel-Czermak's disease, but this later gave way to the name by which it is known, retinal angiomatosis. Other names were suggested from time to time, such

as diffuse angiogliomatosis of the retina, diffuse gliosis of the retina, and arteriovenous retinal aneurysm. The characteristic lesion is a capillary angioma of the retina in masses of varying size. The artery leading into the mass and the vein passing therefrom lose their normal appearance, and they can only be identified as artery and vein by following them back to the stalk from which they spring. This abnormal distension and tortuosity of the vessels concerned is indeed characteristic, and may be noted in the author's case (see colored frontispiece), in which the retinal detachment is as yet limited, and also in the Hippel case.

Hemorrhages occur, but not to the extent nor with the frequency found in exudative retinitis, wherein the degenerative and inflammatory sequels of hemorrhage create the characteristic features of the disease. Retinal detachment occurs in these cases, and thereafter a diagnosis may be impossible unless a characteristic angioma node with altered vessels can be seen. Iridocyclitis, synechia, lens opacity, and finally absolute glaucoma follow one another during the years that complete

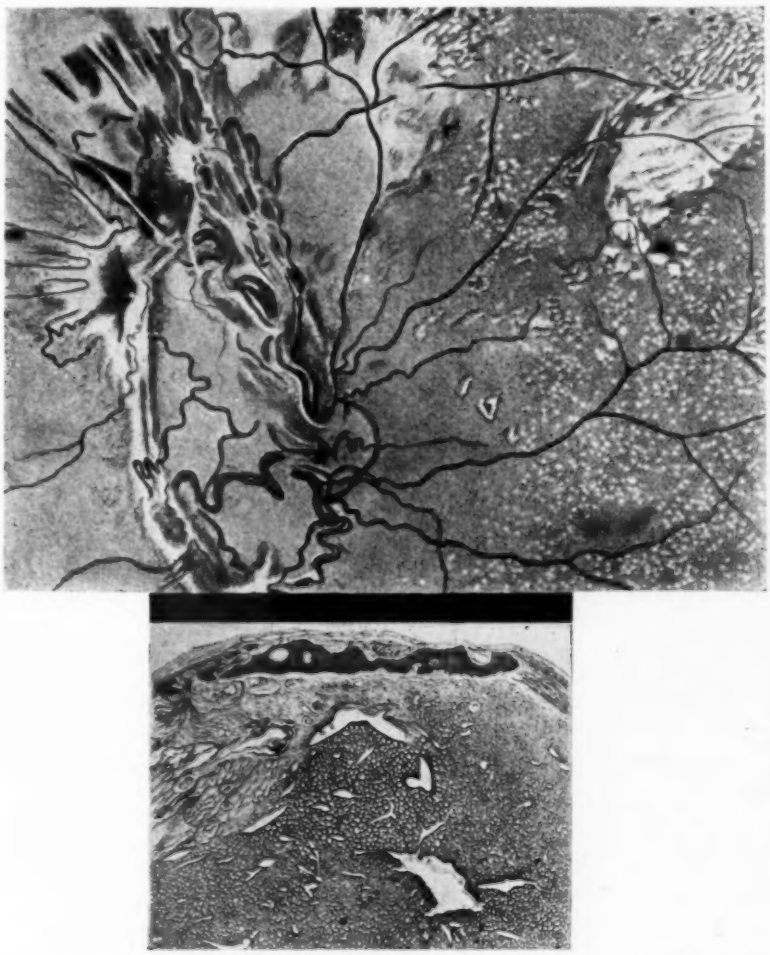


Fig. 3 (Lloyd). Angiomatosis retinæ. Wood's case in 1892, with microscopic section by Collins in 1894. (From Transactions of the Ophthalmological Society of the United Kingdom.)

the cycle of these cases. Some cases have been under observation for as many as sixteen years, but most of these cases have been diagnosed by the pathologist to whom an eye enucleated for absolute glaucoma in a young person or a young adult, or one removed from a child as young as two years because a diagnosis of tumor had been given.

The microscopic picture is, as one would expect, of masses of capillary vessels. In addition, cystic areas, cholesterin crystals, new vessel formation, and even bone formation have been found. The features mentioned may be obscured by secondary inflammation and glaucoma. Many points of similarity exist between this disease and that described by Coats, but they are the results of degeneration of blood and of the products of inflammation. Bone formation occurs in long standing inflammations of the uvea, and cholesterin crystals and organized tissue and new vessel formation are by no means limited to this disease group.

The subjective symptoms are limited in the early stages to poor vision, with exacerbations later, caused by detachment by hemorrhage. If the mass of capillary vessels is located in the central areas and the retina is lifted by fluid or organized exudate, a reflex not unlike that of glioma may be returned, and, if this occurs in a small child, a diagnosis of tumor is very likely. There is no pain until iritis or glaucoma complicates the situation.

While the patients have been as young as two years, most are young adults, but some in the sixth decade have been reported. It is probable that the original lesions are present at birth and increase gradually until hemorrhages and exudate detach the retina and attract attention because of the poor vision or secondary symptoms. During the past decade, coeval brain complications have been studied. These have been capillary angiomas of the brain or cord.

Lindau, after studying twenty-four cerebellar cysts or angioplastic tumors, asserts that the initial lesion is a capillary angioma and that cystic degeneration of this structure may create spaces in the cord or medulla like syringomyelia. Twenty per cent of retinal angiomatosis cases have these brain complications: eight of Lindau's cases also had pancreatic cysts with capillary angiomas in the walls, and in ten cases there were also kidney cysts. Six of the cases had hypernephroma. Nevi upon the face or near the orbit, as has been found with choroidal angioma, are not reported with this disease.

As soon as the retina is detached to any degree, the situation is very much confused and a diagnosis of Coats's disease or tumor is made. There are some who consider Coats's disease as merely an advanced stage of angiomatosis, but the reverse is not held by any observer. The illustration of Wood's case with microscopic section by Collins and a case of my own are shown. The first mentioned would present many difficulties as to a correct diagnosis. The latter shows the fundus of a boy aged six years when he was brought for glasses for a convergent squint of the left eye.

In addition to the characteristic node into which an altered artery enters and from which a very full pair of veins emerge, the author's case presents two other features which may or may not be found with this disease (or any other of this group) and with circinate retinitis.

The zone of white spots, especially those near the superior and inferior vessels as they arch about the macula, are translated as results of minute hemorrhages beneath the retina, with subsequent degeneration. These are especially frequent in the eyes of elderly people with circinate retinitis, which is a senile vascular degeneration allowing minute masses of blood to exude from the finer vessels. The white streak posterior to the retinal vessels running outward from the central node may be either an organized proliferation external to the retina or a long straight vessel sheathed in exudate.

This boy has been under observation for six years, and the change in appearance of the fundus is amazingly small. With red-free light, the node looks yellow, as if there was fluid within. This lump is only two diopters high. The boy's general health is perfect and there has been no complaint from him whatever until the last year. To the fingers the tension of this eye seems higher than that of the normal eye, but this is recent and has developed during the past few months, since he began to complain of a dull pain in the eye at times. It is only with the greatest difficulty that I have kept in touch with him and, at the present, he is living in a distant city where I am trying to place him in the care of a colleague.

A final fact concerning Hippel's disease is an occasional report of two or more cases in the same family, such as father and son, or brother and sister. Also, now and then, both eyes of the patient are involved at the same time, with one eye in advance of the other.

External exudative retinitis (Coats's disease)

This disease was established as an entity by Coats in 1908. The first observation of it seems to have been recorded by Nettleship in 1876 under the title "remarkable case of choroidoretinitis in a child without apparent cause". Nettleship's record was as follows: "Eliza R., aged 12 years, poor vision in right eye. In periphery, large patches of absorbed choroid with pigment accumulated on them. In more central parts there are very large areas of white deposit with woolly borders and quite different in appearance from the atrophic patches. The retinal vessels often run unobstructed over the white patches and are nowhere hidden. . . . . At the lower part of the periphery, the retina was detached over a considerable area and there were abundant glistening scales of cholesterine scattered about on the retina or in the choroid: some on the white deposits and others overlying the apparently normal choroid. They were all fixed and there were no moving crystals in the hazy vitreous. . . . . Three months later I saw her again and found that the two blood patches had nearly disappeared, but in other respects there was no change."

A number of isolated observations, some with microscopic examination, followed, but in 1908 Coats's article with full examination of eight cases cleared up the situation with one exception. For a time he included retinal angiomatosis in his group, but Hippel's article righted the matter in a few years.

The basis of the disease is a hyaline degeneration of the vessel walls, endophlebitis, and endarteritis. The characteristic large woolly mass with vessels running over it is the result of hemorrhages into the subretinal space and their subsequent degeneration or organization, with the formation of cystic spaces, cholesterin crystals, new vessels and even bone. The choroid is but little involved, but the nervous elements of the outer retinal layers are soon destroyed and there is great thickening of the rest of the retina. Retinal detachment follows as a matter of course, iridic inflammation with synechiæ is common. The lens becomes opaque, and finally absolute glaucoma develops and enucleation is required to relieve the pain.

The patients are not quite so young as those reported with angiomatosis, but patients of six years are recorded. Most of the patients are in the late twenties or early thirties and a fair number in the sixties and seventies will be found among those reported. The latter group differs somewhat from the rest of the cases in that the macular area is the location of the lesion. On one side, they resemble (or originate in) retinitis circinata, and on the other, Kuhnt's disciform degeneration of the macula.

Cases of retinitis circinata in one eye and Coats's disease in the other, and of circinate retinitis passing into typical exudative retinitis, are also recorded. Proliferating retinitis and exudative retinitis may also occur in each

eye of the same patient. The cause of circinate retinitis is similar to that of exudative retinitis—hemorrhages into the deeper layers of the retina or between it and the choroid, but on a much smaller scale. It would occasion no wonder then if some of the circinate cases passed into the exudative type with the huge mass raising the retina from the choroid.

Very few cases of bilateral exudative retinitis have been reported. Cases do not run in families nor is there any relation to nevi upon the face. Syphilis is not a factor. Several of the reported cases have had definite tuberculous lesions elsewhere but not in the eye. The similarity of Coats's disease to advance angiomatosis has evoked the suggestion that exudative retinitis is but an advanced form of angiomatosis. The subjective symptoms are few until complications occur. Poor vision which develops without known date of onset is the first sign. Exacerbations of this poor vision have also been recorded, and are due to hemorrhage or detachment.

A deviating eye in a small child may occasion an examination, with the finding of a large white mass in the fundus or a white reflex.

Some years after the onset of poor vision, pain from iritis or glaucoma becomes insistent, and the eye is enucleated without a diagnosis of the cause of the glaucoma because examination of the interior is impossible. It is not at all unusual for the first inkling of the cause of all the trouble to come from the pathologist. As would be imagined, the effect of these masses upon the visual fields in the early stages is total loss of function in a wedged-shaped area like that of vessel block. The literature of this disease is more extensive than that of angiomatosis, something like a third more cases being recorded.

Angioma of the choroid

This is very rarely diagnosed in life, because there are no symptoms except gradual loss of vision until retinal detachment or glaucoma, with or without iridocyclitis, occurs.

The microscopic diagnosis is easy, as masses of large vessels gradually replace the choroid and cannot escape notice unless too limited in area to cause trouble. Very few cases have been seen during life, but that reported by Fehr is a notable exception, as it was under observation for twenty years before glaucoma made enucleation necessary. A few others have been noted during life in cases with nevi about the face and orbit. In addition to involvement of the choroid,

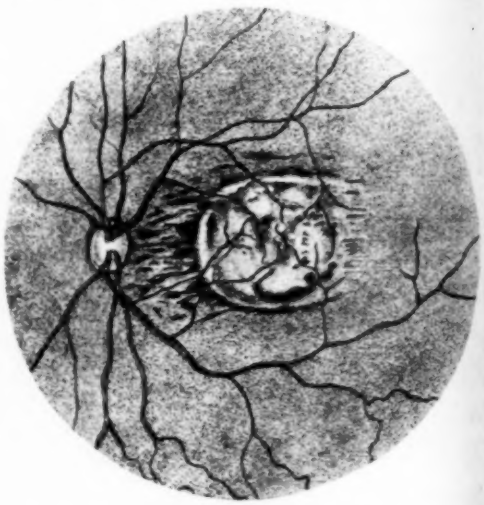


Fig. 4 (Lloyd). Fehr's case of angioma of the choroid, many years before enucleation. (From Centralblatt für praktische Augenheilkunde, vol. 29, 1905.)

several cases with brain complication are in the literature. The number of cases recorded is very small, but it is probable that more have escaped notice than have been observed. The extrapapillary coloboma so well described and illustrated by Lindsay Johnson seems to be a form of this same condition, but innocent of other damage than loss of function of the small retinal area involved. On the other hand, angiomatosis retinæ, or Hippel's disease, is different only in that the vessel formation involves the retina most and the choroid secondarily, and is a capillary mesh instead of snarls of larger vessels.

The patients are younger as a class than the rest of this group, but a few in

the seventies will be found in the literature.

These lesions are considered congenital, but many years must elapse before the effects upon vision or upon the tension of the eye are evident. If the lesion is macular, the poor vision may exist from the earliest days and escape notice by the patient, but if located in the periphery the lesion or lesions may become very large before attracting attention.

The ophthalmoscopic appearance of the very few cases examined at a time when worth while is that of a small mass of light color with soft outlines, and usually in the vicinity of the macula. There is nothing to distinguish it from any of the conditions of this group at the time when the retinal detachment is limited. It is, however, much rarer than any of the others.

Years pass before this rather insignificant mass attracts attention, but finally, as with all of the conditions grouped here, the case closes with a blind eye in a state of absolute glaucoma. Quite a few cases of nevi about the face and orbit have also had choroidal angiomas, and for this reason all such cases should have an ophthalmoscopic examination.

The choroid is not the only organ where these coeval angiomas may be found, for the records show them to coexist in the brain, spinal cord, and abdominal viscera. The type of nevus of the face known as flammeus has been found in a number of patients with glaucoma at an earlier age than the average, and several cases of congenital hydrophthalmus with this type of facial nevus are also recorded.

A case coming under observation recently showed very marked epibulbar and conjunctival telangiectasia with proptosis, and the eye was amblyopic and the retinal veins tremendously enlarged. There was no vessel communication or aneurysm. Weve reported a case of varix of the retina with a history of hematuria for fifteen years, and also hematemesis, which would suggest other nevi in the stomach and kidney.

The vision is often very poor in the eye on the side where nevus involves the orbital region, and the veins are very full and tortuous, but there is nothing to show why the vision is so poor in such eyes. In the venous engorgement of pulsating exophthalmus, the vision also fades with no visible retinal change other than the very full vessels and a delicate cloud over the fundus.

Formation of new vessels and vessel communications after injury by blunt force

After a severe blow upon the eye, the function of the macular area is often lost at once and, as the objective signs are too slight to account for the loss of vision, medicolegal questions arise. The veins in these cases become very full and tortuous, and there is also a large central scotoma. The patient often passes from observation at this stage but may return years later with a blind eye, an opaque lens, and high tension. Enucleation follows as a matter of course, and the new vessels and communications formed in the meanwhile may easily be overshadowed by the inflammatory and glaucomatous changes, and may also escape the pathologist.

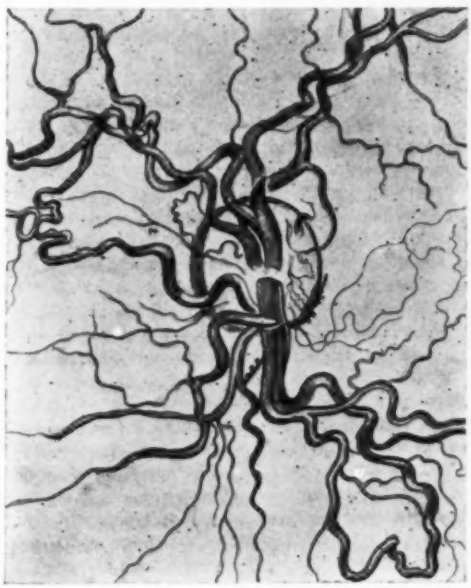


Fig. 5 (Lloyd). Magnus' case of arteriovenous retinal aneurysm. (From Klinische Monatsblätter für Augenheilkunde, 1874, vol. 12.)

The missing link in this history is shown by the illustration of Magnus' case which appeared in 1874. The time between the injury and the imperative symptoms is a matter of years, not months, and this is the reason why so few such cases come under the observation of any individual. This condition is not to be confused with macular degeneration after similar injuries, which is a very well known condition.

The vessel communications are usually between vein and vein, and not so often between artery and vein. The damage to vision is much more serious than the vessel condition would seem to indicate. It appears early and is probably not due to the vessel changes, but to the damage done by the sudden blow.

The literature upon this subject is not extensive, and is here placed along with that of angioma.

Tuberculosis

"Out of the large number of eye diseases that Beer included under the name of amaurotic cat's eye, and among which as the most frequent forms glaucoma and fungus haematodes were found, von Ammon first separated a disease process with symptoms very like those of fungus medullaris but characterized by a different course and considered by him as medullary cancer aborted by tuberculosis." (Manz)

Tuberculoma of the choroid in the early stages may simulate tumor, angiomatosis, or exudative retinitis. Tuberculous iridocyclitis, or any other form of tuberculous disease of the uvea, may produce an opaque lens, iritic adhesions, and finally glaucoma. During the early stages of a tuberculoma, the vitreous may be clear and the retinal vessels can be seen running over a large white mass. Vitreous haze soon appears and this generally increases steadily until the fundus is obscured. Eventually, organized masses project into the vitreous, but the picture of retinitis proliferans is usually obscured by the vitreous and lens opacities. The lens opacities begin with a blurred spot at the posterior pole which appears somewhat iridescent with the slit-lamp. Once established, the lens opacities usually progress steadily to complete opacity.

Pain and circumcorneal redness may be absent, and it is not unusual for a child of fifteen years or so to appear for examination because members of the family have noted the odd appearance of the affected eye as compared with the black pupil of the other eye. In contrast with this type is the case with very pronounced iritis which may overshadow the fundus condition if it is an accompaniment, and it usually is.

In both types, the slit-lamp is a most important diagnostic help, for it will show the nodules on the iris edge which are pathognomonic of tuberculous eye disease. Each efflorescence of tuberculous iritis is accompanied by the sudden appearance of a group of these nodules which may produce adhesions between iris and lens despite dilatation ad maximum.

These same nodules appear during the acute stages of processes in the posterior portion of the eye irrespective of the presence of an iritis. In addition to these nodules, thousands of bits of fibrin are deposited upon the posterior surface of the cornea until in extreme cases the corneal luster is dulled. These bits may form small round masses usually more closely grouped on the lower central part of the posterior corneal surface, making the "mutton fat" deposit so well known and so strongly suggestive but by no means pathognomonic of tuberculous processes.

The tuberculous processes appear particularly in young persons and again at the age of fifty or sixty years. The young patients are rarely younger than fifteen years, which is older than the youngest afflicted with angiomatosis and exudative retinitis. Tuberculosis of the fundus may also appear like disseminated choroiditis or it may affect the vessel walls, especially those of smaller veins often producing recurrent intraocular hemorrhages. Retinitis proliferans may develop in this latter group but an opaque lens and finally glaucoma may be the outcome.

A suspicious but not pathognomonic sign is heterochromia. This usually be-

gins when the lens is partially clouded, when the ring of pigment at the iris edge begins to fade. The iris stroma then pales and looks washed out, and the radiating striæ that contain the blood vessels of the iris stand out prominently. The contrast between the normal eye and the diseased one may be striking indeed, as a glance at the illustration of such a case will show. This is undoubtedly a trophic change resulting from long continued inflammatory or degenerative disease of the ciliary body and may go on either with or without manifest iridic inflammation.

Our ideas of many obscure eye diseases like heterochromia are based on observations made prior to the common use of the slit-lamp, and the microscopic deposits on the posterior corneal surface have not been observed in many such cases. These positive signs of low grade intraocular disease have escaped notice, and the changes in iris color have been attributed to sympathetic nerve influence or other unknown cause. It is an accepted fact that the heterochromic eye is liable to cataract. The explanation why this is so has not been satisfactory, but with the help of the slit-lamp we are beginning to understand what has hitherto been a mystery. The important point for our purposes is the fact that iris nodules can be seen upon the edge of the iris during acute stages of tuberculous conditions of the eye even if there are no signs of iritic complications, and even if the lesion is located far back in the eye.

The illustrations offered include a case of tuberculoma of the choroid at a stage when the vitreous opacities are beginning to blur the fundus picture. While the diagnosis was never difficult, the iris nodules seen with the slit-lamp removed all doubt. The anterior portion of the eye has never shown the slightest redness or other change visible to the naked eye, but the fibrin deposit on the posterior surface of the cornea in the form of thousands of minute fibrin bits appeared early, with an occasional nodule which never formed synechiæ. (See colored frontispiece.)

The vascular lesions seen in young adults are not likely to be confused with tumor, but lens opacity and either glaucoma or softening of the eye with retinal detachment, or proliferations into the vitreous, may make it impossible to look into the eye and may present a most interesting problem for the diagnostician. The literature of this subject is extensive, but the literature that includes the findings of modern diagnostic apparatus is most valuable to us although as yet available in only a moderate number of cases.

Cyclitic membranes

A decidedly unusual condition apt to be confused with tumor is the formation of a membrane covering the retina following sharp inflammation and especially after penetrating injury of the eye. A second form of membrane, located just behind the lens and occurring after inherited specific inflammations, interferes with a satisfactory

Fig. 6 (Lloyd). Cyclitic membrane from a case of old penetrating wound of the eye. The ophthalmoscopic picture simulated an intraocular tumor.

view of the interior of the eye and may lead to a false diagnosis. This last type may occur in children after long continued eye inflammation with a negative Wassermann; but a knowledge of the parents or a later chronic interstitial inflammation of the cornea may establish the diagnosis despite this apparent negation. In older persons, it has been observed in patients with a

four plus Wassermann, but in these an involvement of the cornea, as shown by the slit-lamp, is of decided value in establishing the diagnosis.

The type of cyclitic membrane following penetrating injury of the eye is shown in the illustration of a half section of the eye in a young man who denied all history of injury. The eye was blind and painless and free from irritation. Nothing in the fundus was visible except this white layer with an occasional dimly seen vessel. As the eye was sightless, its removal was advised, but the pathologist found the place where the eye had been penetrated, and also showed the absence of malignancy. When the patient received the pathologist's report, he recalled that he had been told of an injury when he was very small, but the fact had escaped his memory until positively demonstrated. It is remarkable how such an injury can escape the notice of those accustomed to examining eyes, but the microscopic section shows that it can easily occur.

From volume eight of the Royal London Ophthalmic Hospital Reports comes the following: "Case of supposed glioma of retina: 2½ year boy in good health. Parents had noted a peculiar appearance of the eye four days prior to enucleation. Section showed the retina everywhere covered with a white material which at first seemed a part of the retina but which was easily detached therefrom after a few days' soaking in Müller's fluid, leaving the retina but little altered. It would appear as if the vitreous had been condensed at its periphery to form a membrane there on the retina. . . . . The retinal elements are all present and but moderately changed."

Remains of hyaloid sheath

This problem, seemingly simple to solve, becomes most complex if an inflammatory condition, intraocular hemorrhage or detached retina, is added. In four cases of a group of twenty-three eyes removed at the Royal London Ophthalmic Hospital with the diagnosis of intraocular tumor, these vascular remnants were the cause of the mistaken diagnosis. So unobtrusive are these vascular remnants in the usual case examined with the slit-lamp, that the degree of prominence necessary to create a likeness of glioma endophytum seems impossible. Nevertheless, the records of large eye hospitals show each year a few that have confused the best diagnosticians.

The uncomplicated case with vascular remnants can be diagnosed with the slit-lamp, since with this instrument the attachment of the hyaloid vessel remains to the lens near its posterior pole, and the absence of inflammatory signs, would be diagnostic. But with the complications named a diagnosis would be impossible. A sample of one of these complex cases will be found in the Royal London Ophthalmic Hospital Reports, volume 8, page 543: "A 3½ year girl has been under the care of Mr. Hutchinson. The vision of the affected eye is nil and through the pupil appears a retinal detachment. Section of the eye showed a posterior central capsular opacity from which a slender fibrous cord extended to the optic disc. The retina is detached everywhere except at the disc and a narrow strip to and including the macula, and shrouds the fibrous cord."

14 Eighth avenue.

Bibliography

Hippel's disease or angiomatosis retinae

1879. Panas and Remy. Décollement kystique de la rétine. In Anatomie Pathologique de l'Œil, p. 88, Paris.

1882. Fuchs. Aneurysma arteriovenosum retinae. (26 yr. male. Plate.) Arch. f. Augenh., v. 11, p. 440.

1890. Darier. Dégénérescence cystoïde bilatérale de la rétine. (33 yr. female.) Arch. d'Opht., v. 10, p. 203.

1892. Wood. Retinal detachment with unusual dilatation of retinal vessels and other changes. (20 yr. male.) Trans. Ophth. Soc. United Kingdom, v. 12, p. 143.

1894. Collins. Two cases, brother and sister, with peculiar vascular new growth, probably primarily retinal, affecting both eyes. (20 yr. male; 26 yr. female. See Wood's case.) Trans. Ophth. Soc. United Kingdom, v. 14, p. 141.

Westoff. Eigenthümlicher Fall varicöser Netzhautvenenerweiterung. (18 yr. female. Ill. and field chart.) Zent. f. prakt. Augenh., v. 18, p. 166.
1897. Barrett. Intercolonial Med. Jour. Australia, v. 2, p. 262.
1899. Goldzieher. Ein neues ophthalmoskopisches Bild. (Degeneratio fibromatosa interstitialis retinæ.) (23 yr. female.) Zent. f. prakt. Augenh., v. 23, p. 65.
1900. Dialowski. Ein seltener Fall von Gefässerkrankung in der Retina. (23 yr. male.) Inaug. diss. Giessen.
1901. Feilchenfeld. Ein ungewöhnlicher Form von Erkrankung der Netzhautmitte. (25 yr. male. Plate.) Zeit. f. Augenh., v. 5, p. 115.
1902. Laplat. Aneurysme arterioveneux de la rétine. (19 yr. male.) Zeit. f. Augenh., v. 7, p. 255.
1904. Hippel. Uber eine sehr seltene Erkrankung der Netzhaut. (23 and 28 yr. males.) Arch. f. Ophth., v. 59, p. 83.
1905. Czermak. Pathologisch-anatomischer Befund bei der von E. Hippel beschriebenen sehr seltener Netzhauterkrankung. (32 yr. male.) 32 Ophth. Gesell. zu Heidelberg, p. 184.
Haubold. Fall von Retinitis nach von Hippel. Inaug. Diss. Jena.
Jacoby. Ein weiterer Fall der mit aneurysmaartigen Bildungen der Retinalgefässe verbundenen Retinalerkrankung. (30 yr. female.) Klin. M. f. Augenh., v. 43, pt. 1, p. 138.
Wood. Detachment of the retina. (35 yr. male.) Trans. Ophth. Soc. United Kingdom, v. 25, p. 96.
1906. Gurwitsch. Aneurysmatische Venenerweiterung in der Netzhaut. Westnik Ophth., p. 202. Nagel's Jahresbericht, v. 37, p. 604.
Lagrange. Tumeurs de la rétine. Encyclopédie Franç. d'Opht., v. ó p. 1061.
1907. Guzmann. Zwei Fälle einer sehr seltenen Netzhauterkrankung. (case 2, 29 yr. male.) Zeit. f. Augenh., v. 17, p. 40.
1908. Terson. Dilatations artérioveineuses aneurysmales de la rétine. Ann. d'Ocul., v. 139, p. 354.
1909. Griffith and Ormond. Massive exudate of retina with arteriovenous communication. (15 yr. and 31 yr. sisters.) Trans. Ophth. Soc. United Kingdom, v. 29, p. 279.
Wood. Retinitis exudativa with extreme distension of vessels and perhaps arteriovenous communication. (50 yr. female.) Trans. Ophth. Soc. United Kingdom, v. 29, p. 115.
1910. Pooley. Angioma of retina. (32 yr. male.) Trans. Ophth. Soc. United Kingdom, v. 30, p. 238.
1911. Hippel. Die anat. Grundlage der von mir beschriebenen sehr seltenen Netzhauterkrankung. Arch. f. Ophth., v. 79, p. 350.
1912. Frank-Kamenetzki. Fall von v. Hippelschen Krankheit. (14 yr. female.) Westnik Ophth., p. 213. Nagel's Jahresbericht, v. 43, p. 817.
Frenkel. Angiome capillaire de la rétine. Ann. d'Ocul., v. 147, p. 161.
Moore. Bilateral angioma of retina. (20 yr. female, both eyes.) Trans. Ophth. Soc. United Kingdom, v. 32, p. 76.
Mullen. Retinal disease with massive exudation. (20 yr. male.) Trans. Ophth. Soc. United Kingdom, v. 32, p. 3.
Seidel. Über ein Angiom der Netzhaut. 38 Ophth. Gesell. zu Heidelberg, v. 40, p. 335.
1913. Bane. Angiomatosis retinae. Ophth. Record, v. 22, p. 199.
Meller. Über das Wesen der sogenannten von Hippelschen Netzhauterkrankung. (20 yr. male.) Arch. f. Ophth., v. 85, p. 255.
Stern. Über Angiomatosis retinæ. (14 yr. male, both eyes.) Zent. f. prakt. Augenh., v. 37, p. 298.
Vossius. Die Angiomatose der Retina. Sammlung zwanglos. Abhandl., v. 9.
1914. Ginsburg and Spiro. Angiogliomatosis retinæ. (14 yr. male.) Arch. f. Ophth., v. 88, p. 44.
1915. Emanuel. Anatomischer Befund bei einem Fall von Angiomatose der Retina. (2 yr. male.) Arch. f. Ophth., v. 90, p. 344.
Guzmann. Histologie der Gliosis retinæ diffusa. (case 2, 29 yr. male.) Arch. f. Ophth., v. 89, p. 323.
1916. Ischreyt. Über einige seltene Netzhauterkrankungen. (42 yr. male.) Arch. f. Augenh., v. 81, p. 168.
Leber. von Hippel-Czermaksche Netzhauterkrankung. Graefe-Saemisch Handbuch, 2nd ed., pt. 7.
1917. Wessely. Vorstellung eines Falles von Angiomatosis retinæ. Münch. med. Woch., p. 1621.
Hoffmann. von Hippel-Czermaksche Krankheit. Münch. med. Woch., p. 1371. Also Klin. M. f. Augenh., 1918, v. 60, p. 131.
Ditroi. Angiomatosis retinæ. (30 yr. male.) Klin. M. f. Augenh., v. 59, p. 43.

1918. Gamper. Angiomatosis retinæ. (27 yr. male.) Klin. M. f. Augenh., v. 61, p. 525.
Hippel. Uber die diffuse Gliosis der Netzhaut and ihre Beziehungen zur Angiomatosis retinæ. Arch. f. Ophth., v. 95, p. 173.
1919. Frank. Angiomatosis retinæ. Inaug. diss. Würzburg.
Houwer. Von Hippel's disease. (23 yr. female.) Amer. Jour. Ophth., v. 2, p. 820.
1920. Clausen. Angiomatosis retinæ. Klin. M. f. Augenh., v. 65, p. 413.
Erggelet. Angiomatosis retinæ. (15 yr. female, both eyes.) Klin. M. f. Augenh., v. 65, p. 413.
Gourfein-Welt. Beziehung der Retinitis exsudativa zu der Angiomatosis. (16 yr. male. both eyes.) Klin. M. f. Augenh., v. 65, p. 105.
Tresling. Angiomatosis retinæ. (27 and 25 yr. males.) Klin. M. f. Augenh., v. 64, p. 306.
1921. Bergmeister. Gliose Wucherungen im Auge bei Mikrophthalmus congenitus und Beziehungen zur Angiomatosis retinæ, Arch. f. Ophth., v. 105, p. 1.
Brandt. Frage der Angiomatosis retinæ. (Father and son.) Arch. f. Ophth., v. 106, p. 127.
Miyashita and Nisyake. Pathological anatomy of retinal degeneration with multiple aneurysms. (15 yr. male.) Klin. M. f. Augenh., v. 68, p. 272. Brit. Jour. Ophth., v. 5, p. 433.
1922. Berblinger. Auffassung von der sogenannten von Hippelschen Krankheit der Netzhaut. (Angiogliosis retinæ and cerebri.) (27 yr. female.) Arch. f. Ophth., v. 110, p. 395.
1923. Aust. Hippelsche Ekrankung mit Stauungspapille and Hæmangioma. (29 yr. male, both eyes, brain tumor?) Zeit. f. Augenh., v. 50, p. 305.
Ditroi. Entwicklung der Angiomatosis retinæ. Klin. M. f. Augenh., v. 71, p. 670.
Heine. Angiogliosis retinæ mit Hirntumor. Zeit. f. Augenh., v. 51, p. 1.
1924. Friedrich. Fall von v. Hippelscher Krankheit. Diss. Halle.
Tschenzow. Fall von Angiomatosis retinæ. Russkij Opht., Jour., v. 3, p. 296.
1926. Alperin. Massive exudative retinitis and angiomatosis retinæ. Amer. Jour. Ophth., v. 9, p. 532.
Lindau. Studien über Kleinhirncysten, Bau. Pathogenese, und Beziehungen zur Angiomatosis retinæ. Acta path. e microbiol., supplement 1.
1927. Hippel. Noch einmal zur Angiomatosis retinæ. Arch. f. Ophth., v. 118, p. 348.

Retinitis exsudativa externa: Coats's disease

1876. Brailey. Examination of an eye removed for retinal growth of doubtful character. Ophth. Hosp. Reports, v. 8, p. 548.
Nettleship. Two remarkable cases of chorioretinitis in children. Ophth. Hosp. Reports, v. 8, p. 515.
1884. Cros. Sarcome ossifiant de la rétine. Bull. et Mém. de la Soc. franç. d'Ophth., v. 2, p. 121.
1886. Snell. Cholesterin crystals visible in detached retina. Trans. Ophth. Soc. United Kingdom, v. 6, p. 388.
1888. Lawford. New tissue formation on inner side of choroid. Trans. Ophth. Soc. United Kingdom, v. 8, p. 178.
1889. Collins. Microsections of a neoplasm between choroid and retina, exhibiting peculiar characteristics. Trans. Ophth. Soc. United Kingdom, v. 9, p. 198.
1894. Cramer and Schultze. Kasuistik and Anatomie der Pseudoglioma. Arch. f. Augenh., v. 29, p. 288.
Ginsburg. Choroiditis exsudativa als Pseudogliom. Zent. f. prakt. Augenh., v. 18, p. 322.
1895. Guaita. Mioma della coroide. Ann. di Ottal., v. 24, p. 25.
Schiess-Gemuseus. Chorioretinitis mit eigentümlicher weissen Verfärbung der Retina mit Ausgang in Heilung bei einem 12 Jahr Mädchen. 31. Jahrbuch der Augenheilanstalt in Basel.
1896. Doyne. Peculiar condition of retina due possibly to small aneurysms and extravasations of blood. (8 yr. male.) Trans. Ophth. Soc. United Kingdom, v. 16, p. 94.
Siegrist. Eine wenig bekannte Form von Netzhauterkrankungen in Folge von Zirkulationsstörungen. 25. Ophth. Gesell. in Heidelberg, p. 83.
1897. Oeller. Aneurysmata miliara arteriarum retinæ. (plate 116.) Atlas der Ophthalmoskopie.
1899. Gunn. Chronic retinal changes of unusual character. Trans. Ophth. Soc. United Kingdom, v. 19, p. 62.
1900. Schieck. Choroiditis exsudativa plastica. 28. Ophth. Gesell. in Heidelberg, p. 88.
1901. Carpenter and Stephenson. Society for study of disease in children, v. 1, p. 169.
Feilchenfeld. Ungewöhnliche Erkrankungen der Netzhautmitte. Zeit. f. Augenh., v. 5, p. 115.

1902. Parsons. Microsections of fatty and calcareous degeneration of retina. Trans. Ophth. Soc. United Kingdom, v. 23, p. 225.
1903. Lawson. Unusual retinochoroidal changes, result of hemorrhages and fibrinous deposits in deepest layers of retina. Trans. Ophth. Soc. United Kingdom, v. 23, p. 64.
Paton. Tuberculous choroiditis. Trans. Ophth. Soc. United Kingdom, v. 23, p. 63.
1904. Parsons. Sections of Mr. Paton's case of tuberculous choroiditis. Trans. Ophth. Soc. United Kingdom, v. 24, p. 149.
1905. Bickerton. Peculiar changes in optic disc, retina and choroid; (?) tubercle. Trans. Ophth. Soc. United Kingdom, v. 25, p. 102.
Doyne and Stephenson. Cribriform choroidoretinitis. Trans. Ophth. Soc. United Kingdom, v. 25, p. 100.
Van Geuns. Een zeldzaame en eigenaardige retinaal-aandoening. Nederlandsch Tijdsschr. v. Geneesk., v. 1, p. 179.
Hancock. Tubercle (?) of retina. Ophth. Hosp. Reports, v. 16, pt. 2, p. 150.
1906. Doyne. Peculiar conditions of fundus. Ophth. Review, v. 25, p. 154.
Hippel. Pathologischanatomische Befunde bei einer seltenen Netzhauterkrankung. Arch. f. Ophth., v. 64, p. 150.
De Lapersonne. Retinitis exsudativa. Recueil d'Opht., v. 28, p. 164.
1907. Guzmann. Eine sehr seltene Netzhauterkrankung. Zeit. f. Augenh., v. 17, p. 40.
Kraus and Brückner. Tuberculosis os Augenhintergrundes. Arch. f. Augenh., v. 57, p. 157.
Pincus. Seltene Netzhauterkrankung. Klin. M. f. Augenh., v. 35, pt. 2, p. 113.
Weinstein. Eigenthümliches Bild. Klin. M. f. Augenh., v. 45, pt. 2, p. 471.
1908. Coats. Forms of retinal disease with massive exudation. Ophth. Hosp. Reports, v. 17, pt. 3, p. 440.
Kraus and Brückner. Tuberculosis of fundus oculi. Arch of Ophth., v. 37, p. 544.
Morton. Peculiar form of retinal disease. Trans. Ophth. Soc. United Kingdom, v. 28, p. 214.
Pincus. Klin. M. f. Augenh., v. 46, pt. 1, p. 315.
Wintersteiner. Pseudoglioma retinæ. Zeit. f. Augenh., v. 19, p. 387.
1909. Eversheim. Kenntniss des pseudoglioms. Arch. f. Ophth., v. 70, p. 3.
Schweinitz, de. Concerning a form of retinitis with extensive exudation. Amer. Ophth. Soc., p. 273. Arch. of Ophth., v. 38, p. 463. Ophth. Record, v. 18, p. 23.
Verhoeff. Discussion. Amer. Ophth. Soc., p. 283.
1910. Fisher. Retinitis circinata and relation to retinitis with massive exudate. Ophth. Hosp. Reports, v. 18, pt. 1. p. 37.
Randolph. Diagnosis of subretinal mass. Amer. Ophth. Soc., v. 12, pt. 2, p. 466.
1911. Coats. Case of retinitis exsudativa. Ophth. Review, v. 30, p. 289.
Collins. Retinitis exsudativa. Trans. Ophth. Soc. United Kingdom, v. 31, p. 112.
Greeves. Retinal disease with detachment in child. (6 yr. male.) Trans. Ophth. Soc. United Kingdom, v. 31, p. 349.
McMullen. Tumor-like subretinal mass of organized inflammatory exudates. Trans. Ophth. Soc. United Kingdom, v. 31, p. 268.
Nettleship and Laws. Ophth. Review, p. 289.
Coats. Über retinitis exsudativa. Arch. f. Ophth., v. 81, p. 275. (10 cases.)
1912. Leber. Über eine durch Vorkommen multipler Miliaraneurysmen charakterisierte Form Degeneration der Retina. Arch. f. Ophth., v. 81, p. 1. Ophth. Review, v. 31, p. 150.
1913. Hajano. Zur Kenntnis der Retinitis exsudativa. Arch. f. Ophth., v. 84, p. 30.
Harms. Über Retinitis exsudativa. Vereinigung der Württemburgschen Augenärtze, June.
Hippel. Befund bei einem Falle von Retinitis exsudativa. Arch. f. Ophth., v. 86, p. 443.
Wheeler. Retinitis circinata. Arch. of Ophth., v. 42, p. 277.
1914. Friedenwald. Retinitis with massive exudation. Amer. Ophth. Soc., v. 13, no. 3, p. 843.
Gertz. Retinitis proliferans externa. Klin. M. f. Augenh., v. 52, p. 282.
Piekema. Ophthalmology, v. 12, 179, 1915-1916. Tijdsschr. v. Geneesk., Aug. 8, 1914.
1915. Guzmann. Histologie der Gliosis retinæ diffusa. Arch. f. Ophth., v. 79, p. 323.
Van Geuns. Retinitis exsudativa. Arch f. Ophth., v. 89, p. 445.
Van der Hoeve. Retinitis exsudativa. Ophthalmology, v. 12, p. 179.
Zentmayer. Retinal disease with massive exudation. Amer. Ophth. Soc., v. 14, pt. 1, p. 370.
1916. Hegner. Retinitis exsudativa bei Lymphogranulomatosis. (biblio.) Klin. M. f. Augenh., v. 57, p. 27.
Leber. Diseases of the retina. Graefe-Saemisch Handbuch, v. 7, pt. 2, p. 1267.
Stephenson. Arch. of Ophth., v. 45, p. 202.

1917. Holm. Retinitis exsudativa externa. Klin. M. f. Augenh., v. 59, p. 319. (10 cases).
1919. Berg. Pathologie der Retinitis exsudativa. Arch. f. Ophth., v. 98, p. 211.
1920. Siegrist. Discussion. Klin. M. f. Augenh., v. 65, p. 106.
1921. Crigler. Arch. of Ophth., v. 49, p. 287. Amer. Jour. Ophth., v. 4, p. 607.
Rados. Retinitis exsudativa externa. Arch. f. Ophth., v. 105, p. 973.
Selig. Retinitis exsudativa externa mit Netzhautablösung, Cholestearinbildung und Verknocherung in der Aderhaut. Diss. Heidelberg.
1922. Clausen. Übergänge von Retinitis circinata zur Retinitis exsudativa externa. Klin. M. f. Augenh., v. 69, p. 844.
Davis. Arch. of Ophth., v. 51, p. 397.
Dodd. Arch. of Ophth., v. 51, p. 295.
1923. Goulding. Retinitis exsudativa. Trans. Ophth. Soc. United Kingdom, v. 43, p. 685.
Kaiser. Coatssche Krankheit. Diss. Frankfort.
1924. Butler. Retinitis exsudativa. Trans. Ophth. Soc. United Kingdom, v. 44, p. 358.
Carsten. Retinitis exsudativa. Zeit. f. Augenh., v. 54, p. 74.
Cunningham, Neame, and Walker. Retinitis exsudativa. Royal Soc. Med., Ophth. Sec., pp. 23-4-5.
Harrison. Case of exudative retinitis. Trans. Ophth. Soc. United Kingdom, v. 44, p. 358.
1925. Sattler. Über die pathologisch-anatomische Veränderungen der Retinitis exsudativa. Klin. M. f. Augenh., v. 74, p. 222.
1926. Heine. Verschiedene anatomische Befunde in drei Fällen von Coats Retinitis. Zeit. f. Augenh., v. 60, p. 1.
Wöllflin. Pathologische-anatomie der Retinitis exsudativa externa. Arch. f. Ophth., v. 117, p. 33.
1927. Ten Doesschate. Retinitis exsudativa externa. Klin. M. f. Augenh., v. 79, p. 505.
1928. Jones. Retinitis with massive exudate. Amer. Jour. Ophth., v. 11, p. 1.

Angioma of choroid; arteriovenous communication; aneurysmal dilatation

1860. Schirmer. Telangiektasie. Arch. f. Ophth., v. 7, pt. 1, p. 119.
1868. Leber. Cavernöses Sarcoma der Aderhaut. Arch. f. Ophth., v. 14, pt. 2, p. 221.
1870. Lionville. Coexistence d'altérations a neurysmales dans la rétine avec des aneurysmes des petits artères dans l'encéphale. Ann. d' Ocul., v. 64, p. 169.
1874. Magnus. Aneurysma arteriovenosum retinæ (traumatic). Klin. M. f. Augenh., v. 12, p. 265.
1879. Sturge. Nevus of face with epileptiform convulsions of opposite side of body; angioma of choroid. Clin. Soc. Trans., v. 12, p. 162.
1881. Litten. Apoplexie des Gehirns and der Retina bedingt durch miliäre Aneurysmata. Berlin klin. Woch., p. 26.
1883. Horrocks. Telangiectasia of skin and brain. Trans. Ophth. Soc. United Kingdom, v. 3, p. 106.
Story and Benson. Aneurysms on retinal vessels with peculiar retinitis. Trans. Ophth. Soc. United Kingdom, v. 1, p. 108.
1884. Milles. Nevus of right side of face, choroidal and retinal detachment; angioma of choroid. Trans. Ophth. Soc. United Kingdom, v. 4, p. 168.
1885. Lawford. Nevus of left side of face, choroidal subretinal hemorrhage and detachment of retina of left eye. Trans. Ophth. Soc. United Kingdom, v. 5, p. 136.
Nordenson. Cavernöses Aderhautsarkom mit Knochenschale bei einen elfjahrigen Mädchen. Arch. f. Ophth., v. 31, pt. 4, p. 59.
Schleich. Aneurysma arteriovenosum. Mitteil, aus der ophth. Klin. in Tübingen, v. 2, pt. 2, p. 202.
1886. Story. Aneurysmal dilatations on retinal vessels. Trans. Ophth. Soc. United Kingdom, v. 6, p. 336.
1888. Schiess-Gemuseus. Cavernöses Angioma der Choroida. Arch. f. Ophth., v. 34, pt. 3, p. 240.
1889. Rählmann. Miliäre Aneurysmen an den Netzhautgefässen and Netzhautblutungen. Klin. M. f. Augenh., v. 27, p. 203.
1890. Giulini. Cavernöses Angiom der Aderhaut. Arch. f. Ophth., v. 36, pt. 4, p. 247.
Johnson. Extrapapillary colobomata. Arch. of Ophth., v. 19, p. 1.
1894. Panas. Traité des Maladies des Yeux. v. 1, p. 421.
Tailer. Angioma cavernoso della coroide. Ann. di Ottal., v. 23, p. 5.
1896. Pergens. Aneurysmatische Entartung der Makulagefässe. Klin. M. f. Augenh., v. 34, p. 170.
1897. Gloor. Angeborene Schlängelung der Netzhautvenen. (23 year male.) Arch. f. Augenh., v. 35, p. 328.
Moyart and Van Duyse. Varicen der Venæ ophthalmicæ. Soc. Belge d'Opht., April 24.
1898. Elschnig. Anastomosenbildungen an der Netzhautvenen. Klin. M. f. Augenh., v. 36, p. 55. (74 and 76 year males.)

Galezowski. Nævus congénitale sous forme de couperose occupant la face, le front et le cuir chevelu, avec buphtalmie monoculaire. Ann. Dermat. Syph., v. 9, p. 249.
1899. Deyl. Die anatomische Erklärung des sog. Koloboms der Macula. Wien. klin. Rundschau, nos. 2, 3, 4.
Seydel. Aneurysma arteriovenosum. Arch. f. Augenh., v. 38, p. 157.
1900. Wagenmann. Cavernöses Angiom der Aderhaut bei ausgedehnter Telangiektasie der Haut. Arch. f. Ophth., v. 51, p. 532.
1902. Steffens. Angiom der Aderhaut mit Verknocherung bei ausgedehnter Telangiektasie des Gesichts. Klin. M. f. Augenh., v. 40, pt. 2, p. 113.
1903. Wagenmann. Angioma cavernosum chorioideum. Zeit. f. Augenh., v. 10, p. 347.
1904. Beltman. Über angeborene Telangiektasien des Auges als Ursache von Glaucoma simplex. Arch. f. Ophth., v. 59, p. 502.
Kuhlo. Cavernöses Aderhautangiom. Diss. Greifswald.
1905. Fehr. Angioma der Aderhaut. Zent. f. prakt. Augenh., v. 29, p. 161.
Alexander. Ausgedehnte Anastomosenbildung der Retinalvenen auf beiden Augen. Deut. med. Woch., p. 1821.
1907. Meller. Angiom der Chorioidea. Zeit. f. Augenh., v. 17, p. 50.
1908. Stower. Angiom der Aderhaut. Klin. M. f. Augenh., v. 46. pt. 2, p. 323.
Quackenboss. Angioma of choroid. Ann. Ophth., v. 17, p. 645.
1909. Cuperus. Telangiektasie des Gesichts mit Glaucoma simplex. Klin. M. f. Augenh., v. 47, pt. 1, p. 344.
1911. Bergmeister. Angiom der Chorioidea. Arch. f. Ophth., v. 79, p. 285.
1912. Seidel. Angiom der Netzhaut. 32.Ophth. Gesell. in Heidelberg.
Mosso. Anastomose arteriovenose. Ann. di Ottal, v. 41, p. 5.
Raubitschek. Anastomosenbildung zwischen Netzhautarterien und venen. Klin. M. f. Augenh., pt. 2, p. 376.
1913. Salus. Angiom der Aderhaut. Zeit. f. Augenh., v. 30, p. 317.
1914. Love. Angioma of choroid. Arch. of Ophth., v. 43, p. 607. (bibl.)
1915. Hagen. Et tilfælde av angioma chorioideæ. Norsk Mag. f. Lægevid., v. 13, p. 883.
1918. Elschnig. Nævus vasculosus mit gleichseitigem Hydrophthalmus. Zeit. f. Augenh., v. 39, p. 189.
1919. Paton and Collins. Angioma of choroid. Trans. Ophth. Soc. United Kingdom, v. 39, p. 157.
1920. Henderson. Angioma of choroid. Brit. Jour. Ophth., v. 4, p. 373.
1922. Nakamura. Angeborener halbseitiger Nævus flammeus mit Hydrophthalmus und Knochenverdickung derselben Seite. Klin. M. f. Augenh., v. 69, p. 312.
1923. Safar. Histologischer Beitrag zur Frage des ursächlichen Zusammenhanges zwischen Hydrophthalmus congenitusund Nævus flammeus. Zeit. f. Augenh., v. 51, p. 301.
1924. Strader. Nevus at optic disc margin. Amer. Jour. Ophth., v. 7, p. 537.
Zaun. Beziehungen zwischen Nævus flammeus und angeborenem Glaukom. Klin. M. f. Augenh., v. 72, p. 57.
1925. Ehlers. Arteriovenous aneurysm. Acta Ophth., v. 2, p. 374.
1926. Lent and Lyon. Hemangioma of choroid. Amer. Jour. Ophth., v. 9, p. 804. (bibl.)

Tuberculosis of the eye

1829. Ammon. Litterarische Annalen der gesammten Heilkunde von Hecker, v. 5, Sept.
1830. Prael. Beobachtungen über Aftergebilde im Auge. Jour. der Chir. und Augenh., v. 14, p. 584.
1855. Jäger. Ophthalmoskopische Befunde von tuberkulöser Choroiditis. Östreich. Zeit. f. prakt. Heilkunde, no. 4.
1858. Manz. Tuberkulose der Chorioideæ. Arch. f. Ophth., v. 4, pt. 2, p. 120.
1863. Manz. Tuberkulose der Chorioideæ. Arch. f. Ophth., v. 9, pt. 3, p. 133.
1866. Busch. Zwei Fälle von Geschwulstbildung im Augenhintergrunde. Virchow's Arch. f. prakt. Anat., v. 36, p. 448.
1867. Graefe. Tuberkel in der Aderhaut. Klin. M. f. Augenh., v. 5, p. 299.
1868. Graefe und Leber. Über Aderhauttuberkel. Arch. f. Ophth., v. 14, pt. 1, p. 183.
Wells. Choroidal tubercle observed during life. Klin. M. f. Augenh., v. 6, p. 218. Med. Times and Gazette, no. 914, Jan. 4.
1869. Jaeger. Ophthalmoscopic Hand Atlas, p. 214, fig. 121, plate 28.
1873. Michel. Historische Notiz über Tuberkel der Chorioide. Klin. M. f. Augenh., v. 11, p. 363.
1882. Brailey. Tubercle of eye resembling glioma. Med. Times and Gazette, v. 2, p. 512.
1883. Burnett. Large tubercular tumor of choroid. Arch. of Ophth., v. 12, p. 315.
1885. Lawford. Tubercle of choroid. Ophth. Review, p. 248.
1895. Denig. Local tuberculosis of eye. Arch. f. Augenh., v. 31, p. 359.
Silcock. Tuberculosis of iris and ciliary body. Trans. Ophth. Soc. United Kingdom, v. 15, p. 102.

1896. Simon. Netzhautvenenerkrankung als Ursache der jugendlichen Netzhaut and Glaskörperblutung. Zeit. f. prakt. Augenh., v. 20, p. 325.
1897. Spicer and Marshall. Tubercular disease of iris and ciliary body. Trans. Ophth. Soc. United Kingdom, v. 17, p. 31.
1898. Thompson. Intraocular tubercular growths. Trans. Ophth. Soc. United Kingdom, v. 18, p. 172.
1901. Haab. Ophthalmoscopy. Figs. 69 and 70.
1903. Zur Nedden. Die tuberkulose Aderhautgeschwulst. Klin. M. f. Augenh., v. 41, pt. 2, p. 351.
1904. Gunn. Tuberculosis of choroid with double optic neuritis. Trans. Ophth. Soc. United Kingdom, v. 24, p. 127.
1905. Adam. Bedeutung, Vorkommen und Diagnose der choriodealen Tuberkulose. Med. Klin., p. 1445.
Axenfeld. Solitäre Tuberkulose der Aderhaut. Med. Klin., no. 16.
1906. Harms. Chorioiditis exsudativa plastica. 78. Vers. der deutschen Naturforscher and Ärzte in Stuttgart.
Oeller. Atlas seltener ophthalmoskopischer Befunde. D, pl. 3.
Taylor and Thompson. Tubercular tumor of choroid. Trans. Ophth. Soc. United Kingdom, v. 26, p. 98.
1907. Cargill. Solitary tubercle of choroid. Trans. Ophth. Soc. United Kingdom, v. 27, p. 164.
Herford. Retinitis proliferans of tubercular nature. Cent. f. prakt. Augenh., v. 31, p. 203.
Krückmann. Erkrankungen der chorioidea. Graefe-Saemisch Handbuch.
Lubowski. Kenntniss der tuberkulöser Uveitis. Klin M. f. Angenh., v. 45, pt. 2, p. 539.
Snell. Tuberculosis of choroid. Trans. Ophth. Soc. United Kingdom, v. 27, p. 156.
Stock. Tuberkulose als Ætiologie der chronischen Entzündung des Auges. Arch. f. Ophth., v. 66, p. 1.
1908. Derby. Increasing importance of tuberculosis as cause of ocular diseases. Arch. of Ophth., v. 37, p. 515.
Fejer. Solitärtuberkel der Aderhaut. Cent. f. prakt. Augenh., v. 32, p. 257.
Jachontow. Fall von tuberkulösem. Pseudogliom. Westnik Ophth. v. 26, p. 556.
Stephenson. Tuberculosis of choroid. Trans. Ophth. Soc. United Kingdom, v. 28, p. 35.
Theobald. Intraocular tuberculosis closely resembling glioma. Ophth. Record, v. 17, p. 477.
Ulrich. Beiderseitige Choroiditis disseminata. Zeit. f. Augenh., v. 21, p. 179.
Oeller. Atlas seltener ophthalmoskopischer Befunde. D, Tab. 4.
1909. Axenfeld and Stock. Rezidivierende Glaskörperblütungen und Retinitis proliferans auf tuberkulöser Basis. Klin. M. f. Augenh., v. 47, pt. 1, p. 461.
Bernheimer. Choroiditis disseminata auf tuberkulöser Grundlage. Med. Klin., v. 5, p. 1429.
Strickler. Tubercular uveitis. Ophth. Record, v. 18, p. 44.
1910. Brewerton. Chronic tubercular iridocyclitis. Ophth. Review, p. 225.
Fejer. Heilung eines Solitärtuberkel der Aderhaut. Cent. f. prakt. Augenh., v. 34, p. 230.
Ginsburg. Chronische herdförmige disseminierte Aderhauttuberkulose. Arch. f. Ophth., v. 73, p. 538.
Igersheimer. Die ätiologische Bedeutung der Syphilis und Tuberkulose. Arch. f. Ophth., v. 76, p. 217.
Natansohn. Solitäre Tuberkulose des hinteren Augenabschnittes. Klin. M. f. Augenh., v. 48, pt. 1, p. 113.
Oeller. Atlas seltener ophthalmoskopischen Befunde, D, pl. 5.
1911. Axenfeld and Stock. Bedeutung der Tuberkulose in der Ätiologie der intraokulären Hämorrhagien und der proliferierenden Veränderungen der Netzhaut. Klin. M. f. Augenh., v. 49, pt. 1, p. 28.
Bergmeister. Konglomerattuberkel der Chorioidea. Beit. zur Augenh., v. 79, p. 20.
Cords. Juvenile Netzhauterkrankungen. Zeit. f. Augenh., v. 26, pp. 441 and 508.
Salzmann. Tuberculose der Chorioidea unter dem Bilde des Tumors. Klin. M. f. Augenh., v. 49, pt. 1, p. 516.
1912. Harms. Juvenile Periphlebitis retinæ. Klin. M. f. Augenh., v. 50, p. 106.
Igersheimer. Tuberkulose als Ätiologie der Periphlebitis retinæ adolescentium. Arch. f. Ophth., v. 82, p. 215.
Lakah and Monbrun. Iritis et tuberculose massive de la chorioïe. Soc. d'Opht. de Paris, July 2.
Leboucq. Simple tuberculous cyclitis. Soc. Belge d'Opht.
Terrien. Conglomère de la chorioïde. Arch. d'Opht., v. 32, p. 684.

1913. Cramer. Juvenile Glaskörperblutung infolge Periphlebitis retinæ. Klin. M. f. Augenh., v. 51, pt. 2, p. 520.
Oatman. Diagnostics of fundus oculi, v. 1, p. 50, and stereogram 23.
1914. Fleischer. Juvenile Periphlebitis retinæ eine echte Gefässtuberkulose der Netzhaut. Klin. M. f. Augenh., v. 52, pt. 1, p. 179.
1917. Gilbert. Chronische Uveitis und Tuberculide der Regenbogenhaut. Arch. f. Augenh., v. 82, p. 179.
Hippel. Tuberkulöse, sympathische, uund proliferierende Uveitis unbekannter Ätiologie. Arch. f. Ophth., v. 92, p. 421.
1920. Koeppe. Die pathologische Beschlägeformation an der lebenden Hornhautrückfläche, p. 197. Die Irisentzündungen, p. 270. In Mikroskopie des lebenden Auges, v. 1.
1921. Vogt. Atlas of slit-lamp microscopy. Trans. by Von der Heydt, p. 123.
1925. Koby. Slit-lamp microscopy of living eye, p. 130.

ENDOTHELIOMA OF THE ORBIT

Report of a case

Leo L. Mayer, M.D.

SAINT LOUIS

Previously reported cases are briefly reviewed. The twelve-year-old patient had had a progressive bulging of the left eye for five years. Ocular motion was limited in all directions. The diagnosis was supported by x-ray examination. The growth was removed through a Krönlein incision, leaving the optic nerve intact. The subsequent vision was questionable light perception. The pathologist's report is included.

In reviewing the literature of the past fifteen years on tumors of the orbit, the relative dearth of material reported on this subject was noticeable, especially in the case of endothelioma. There seems therefore to be excellent justification for recording this most unusual case.

In 1923 Benedict[1] reported eight cases of tumor of the optic nerve. He appends to his article a chronological table of primary optic nerve tumors among which were four cases of endothelioma. In all of these enucleation was the ultimate outcome.

In 1912 Hudson[2] reported 154 cases of orbital tumor, 29 of them probable endotheliomata. He advised removal of the tumor through the soft tissues unless some vision remained in the affected eye, when the Krönlein method should be the one of choice. Hudson also remarks that Dandy's[3] operation may be indicated where the tumor is thought to be intracranial.

Differential diagnosis of endothelioma from glioma depends on the following factors: In endothelioma (1) the age is greater, and (2) exophthalmos more often precedes visual disturbance; and there is (3) limitation of movement, (4) circulatory obstruction in lids and conjunctiva, (5) pain, and (6) intraocular extension.

A useful summary of Hudson's exhaustive monograph is to be found in the Ophthalmic Year Book, volume nine, pages 371-373[4], and Hudson's statements are also quoted freely by Neame[5], who reported a case in 1923.

In 1915 Arnold Knapp[6] reported a case somewhat similar to the one I am presenting, except that in his case it was necessary to sever the optic nerve. The fundus findings after operation were almost identical with those in my case, although the blood supply was left intact.

In the Jackson volume Goar[7] reviews thirteen cases which he has found in the literature since 1912 and adds one of his own. I was able to find three cases reported and not included in Goar's article, those of Katten[8], Löhlein[9], and De Berardinis[10].

Löhlein found it necessary to enucleate an eye because of glaucoma, and upon pathological examination of the specimen discovered a small endothelioma which gave none of the usual

symptons. De Berardinis describes the removal of a large endothelioma with preservation of the eyeball.

Hudson's differential diagnosis is confirmed in every respect in my case, except as to the youth of the individual and intraocular extension.

Case: R. K., male, aged twelve years, had noted a bulging of the left eye for the past five years. Just after an attack of measles both eyes were swollen and protruded out of the sockets. The right gradually returned to normal in two or three months, but the left remained prominent and was examined by an oculist after it had remained proptosed for two years. At that time the patient was given glasses and told the eye should be watched. No examination had been made in the past three years, but for the past year there had been a noticeable increase in prominence, with frontal headaches at times but no pain.

Dr. E. C. Spitze of East St. Louis, Illinois, has been kind enough to furnish me with his notes on this case four years previous to our investigation of the patient.

February 12, 1924, visual acuity right with +0.5 D. cyl. ax. 90°=20/19; visual acuity left with +0.5 D. cyl. ax. 90°= 20/19. Fundi normal, except possibly a little lymphatic edema at upper disc margin of left eye. February 23, 1924, no headaches since wearing glasses; unable to reduce proptosis by pressure. February 29, 1924, fundus showed distinct fulness of disc, upper temporal half by blurring of margins representing edema. Vision=20/19 with glasses.

April 12, 1924, nasal and sinus examination by Dr. Hansen negative. Fundus same. Dr. Luedde reports protrusion of left eye measures five mm. with exophthalmometer. Thinks the condition caused by an extravasation from postnasal sinuses. X-ray plates negative.

When my observation of the case began, four years later, general physical examination was negative except as to a fairly firm spleen palpable two fingers breadth below the costal margin but not tender.

The right eye had an entirely normal appearance. Visual acuity = 15/15. The left eye was unusually prominent. Both upper and lower lids showed a fair amount of edema which had the appearance of being of long standing.

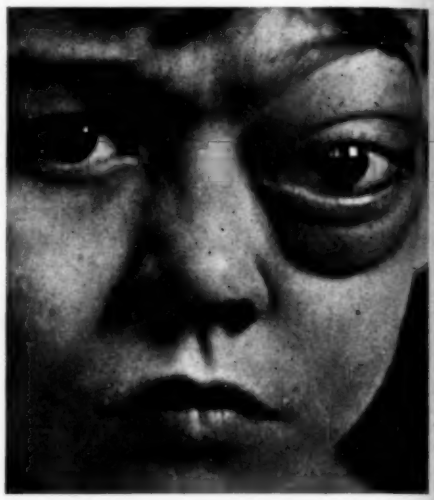


Fig. 1 (Mayer). Endothelioma of orbit.

The vessels of the conjunctiva were enormously swollen and tortuous, especially in the upper cul-de-sac. Motion was limited in all directions, although lateral motion was greater than vertical. The exophthalmometer reading (Hertel) was: right 18, left 30 mm. Visual acuity of the left eye was 15/30, with +1.0 D. sph. —0.5 D. cyl. ax. 0°=15/20.

On closure of the lids there was a faint suspicion of a tumor mass being palpable. The field was contracted and the blind spot definitely enlarged, although this examination was not entirely satisfactory due to the patient's age and mental equipment. The disc was swollen four diopters, but no hemorrhages or exudates could be demonstrated.

X-ray report, posteroanterior view: There was a marked circular soft tissue shadow aiming in the left orbit. There was no evidence of bone destruction. There was a suggestive area of in-

creased density extending anteriorly from the base of the left orbit and apparently attached to it. Diagnosis, tumor of the orbit.

Tenon's capsule was incised and it was quite easy to feel the tumor lying behind the eyeball. Tumor was hard and nodular and attached to the orbital fis-

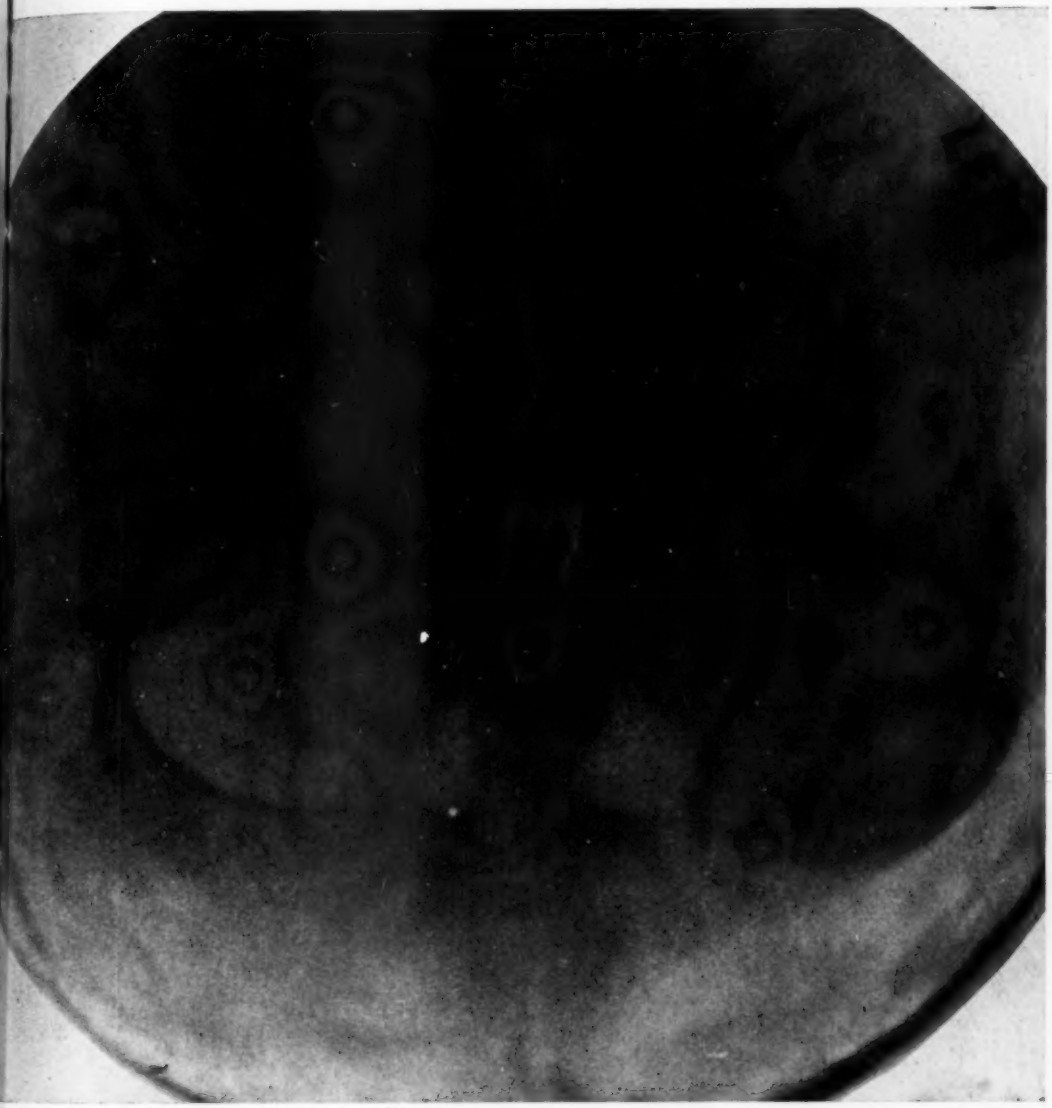


Fig. 2 (Mayer). Endothelioma of orbit, radiograph, posteroanterior view.

Operation: The patient was referred to Dr. Ernest Sachs, who sent him to the Children's Hospital. Dr. Sachs' operative notes from the Barnes Hospital are in part as follows:

"Usual Krönlein incision at the external portion of the bony orbit. . . . sure. Palpating, I finally identified the optic nerve which ran directly through the tumor. After freeing the tumor as much as possible I incised it and removed portion of the tumor that lay lateral to the optic nerve without injuring the nerve. This gave me enough

room to dislocate the portion of the tumor that lay on the mesial surface of the optic nerve . . . . , and this was then removed without any difficulty. The eyeball was not injured. . . . . The nerve was kept intact."

At the operation Dr. Sachs told me he felt that all the tumor had been removed and that there was no tendency for any part of it to enter the cranial cavity. Tenon's capsule was not closed, in order to prevent extravasation of blood into the capsule which could not drain out again.

The progress after operation was uneventful. The immediate swelling of the lids subsided after some few days. The vision was never better than questionable light perception. After a corneal opacity due to exposure had cleared, the disc could be discerned, pale but not raised above the surface of the retina. The macula and the upper temporal quadrant were covered by a large subretinal exudate which gave the appearance of a mild degree of detachment of the retina. A single complication was a noticeable palsy of the maxillary branch of the left seventh nerve. On measuring the exophthalmos with Hertel's instrument there was found to be no recession of the eye, and even three months after leaving the hospital the proptosis was the same.

The pathological report was to the following effect: There were four pieces of tumor tissue varying in size from that of a walnut to that of a small pea. Altogether they weighed twenty-three gms. The tissue was reddish brown in color. There was a definite capsule. Specimen cut with resistance, leaving a yellowish white surface through which ran small whitish bands. Grossly the tissue was of a fibroblastic nature.

With hematoxylin and eosin, microscopic sections showed the tissue to be quite cellular in places, while in other fields fibrous tissue dominated. About the edges, among the darker staining strands of fibrous tissue, were large vascular channels. The supporting structure was apparently derived from the capsule.

In the more cellular areas there seemed no definite architectural arrangements of the cells. On the other hand there was a definite palisading of the nuclei, or streams of cells that ended in a whorl-like formation, quite characteristic of the so-called endothelial growth. The central core of these whorls in places was a single cell, in other instances a small capillary vessel, and scattered throughout the section a few so-called "psammoma" bodies were found.

The cell nuclei for the most part were small, round, or oval in shape, with quite granular chromatin. In some instances there was a condensation of this chromatin, giving the cells the appearance of a neuroblastic type in that these cells were rather large and plump. That these are not neural elements is brought out very clearly in a paper by Penfield[11] on encapsulated tumors of the nervous system.

In attempts with gold impregnation, as well as in sections stained with phosphotungstic acid, no neuroglial elements were found, and repeated attempts with specific stains on sections from different parts of the tumor showed no nerve fibers.

From its gross and microscopic appearance this tumor without question falls into that group for which Mallory[12] proposed the name "fibroblastoma," assuming that such tumors arose from the connective tissue surrounding the nerves.

Pathological diagnosis, perineural fibroblastoma (optic nerve).

It is interesting at this point to recall the comments on the pathology of two cases reported by Williamson-Noble[13] in 1923.

"The arrangement of these cells is very interesting. In the first place they show in part a slight tendency to form spaces, which is a characteristic of endotheliomata, and secondly, there is a very marked tendency to the formation of whorls. In small whorls the cells are intact, but in larger ones they have undergone complete degeneration

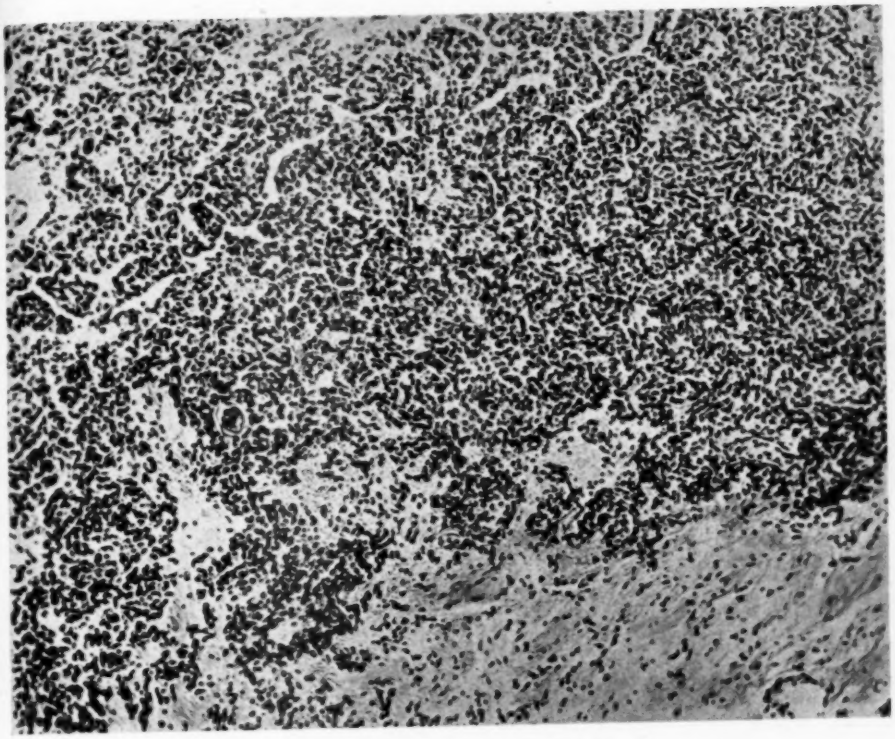


Fig. 3 (Mayer). Endothelioma of orbit; low power.

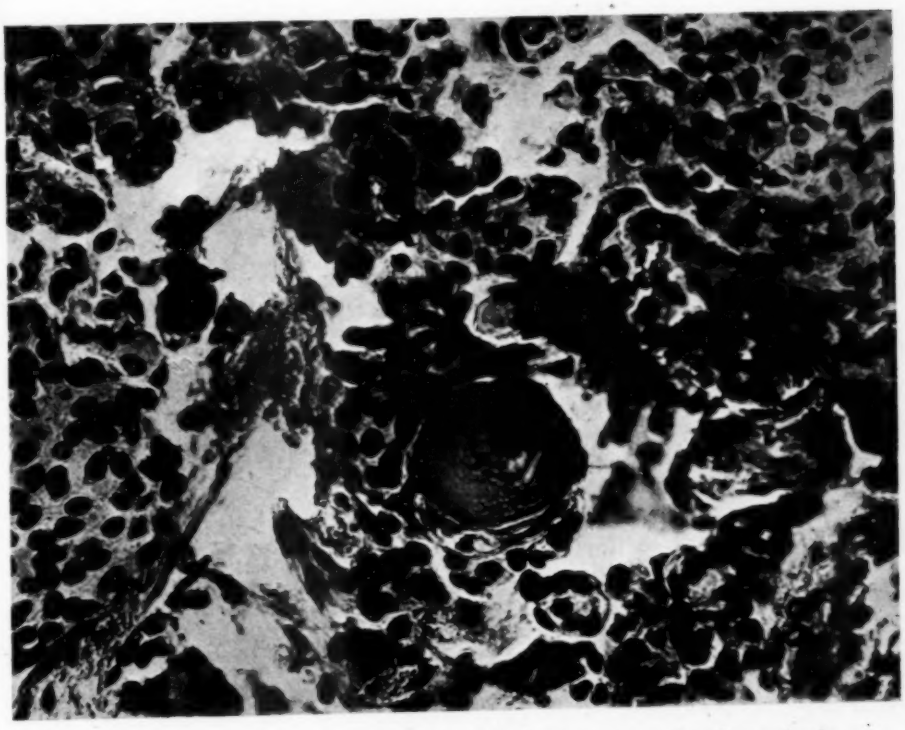


Fig. 4 (Mayer). Endothelioma of orbit, high power, showing whorls.

and present themselves as a plaque of fibrous tissue, which stains uniformly.

"These masses constitute the psammoma bodies found in some meningeal growths."

The accompanying portrait and radiograph are provided by the department of radiology of Barnes Hospital. For the pathological report and photomicrographs of the tumor, I am indebted to Dr. Fincher and the department of neurological pathology of Washington University.

To Dr. Ernest Sachs, and to my associates, Drs. Wolfner, Wiener, and Alvis, I desire to express my appreciation for their cooperation and interest in my report of this case.

900 Carleton building.

References

[1] Benedict, Wm. L. Tumors and cysts arising near the apex of the orbit. Amer. Jour. Ophth., 1923, v. 1, pp. 183-201.
[2] Hudson, A. C. Primary tumors of the optic nerve. Royal London Ophth. Hosp. Rep., 1912, v. 18, pp. 317-439.
[3] Dandy, W. E. Prechiasmal intracranial tumors of the optic nerve. Amer. Jour. Ophth., 1922, v. 6, 169-188.
[4] Ophthalmic Year Book, 1912, v. 9, pp. 371-373.
[5] Neame, H. Brit. Jour. Ophth., 1923, v. 7, May, pp. 209-222.
[6] Knapp, A. A primary tumor of the optic nerve successfully removed with preservation of the eyeball, by the Krönlein method. Arch. of Ophth., 1915, v. 44, pp. 660-665.
[7] Goar, E. L. Contributions to Ophth. Science (Jackson Vol.), pp. 285-292.
[8] Kattan, Azmy El. Primary tumors of the optic nerve. Ophth. Soc. of Egypt, 1924, pp. 82-86.
[9] Löhlein. Zeit. f. Augenh., 1926, v. 60, p. 95.
[10] De Berardinis. Soc. Ital. di Oft., 1924, pp. 314-16.
[11] Penfield, Wilder. Surg. Gyn. and Obst., 1927, Aug., p. 177.
[12] Mallory, F. B. Jour. Med. Research, 1920, v. 4, p. 349.
[13] Williamson-Noble, F. A. Brit. Jour. Ophth., 1923, v. 7, May, pp. 222-231.

RADIUM THERAPY IN VERNAL CATARRH

Report of six cases

FREDERICK C. CORDES, M.D., F.A.C.S., AND WARREN D. HORNER, M.D.
SAN FRANCISCO

Radium therepy in vernal catarrh is worthy of wider application than it has received. An erythema dose is to be avoided, on account of the disturbances which it may produce as much as a year later. Six cases are reported, with exact detail as to dosage and method of application. Read before the Pacific Coast Oto-ophthalmological Society, at Santa Barbara, California, April 19, 1928. From the department of ophthalmology, University of California Medical School.

The use of radium therapy in vernal conjunctivitis has been known for some time. The reports in the literature, however, are not numerous. A review of these in most instances is of little value due to the lack of detail of the methods employed. Important items, such as the amount of radium, whether element or emanations, screening, distance, time and details of application, have often been omitted. More careful clinical reports should be presented in order that one may arrive at a better standard to serve as a guide in the treatment of vernal conjunctivitis. In presenting these few cases we hope to stimulate more work with the detailed recording of the methods employed, so that a better knowledge of radium therapy may be obtained.

One of the earliest reports of the use of radium in vernal catarrh is that of Davidson and Lawson[1]. They successfully treated a twelve year old boy, using 29 to 44 milligrams of radium applied for fifteen minutes. Seven applications were given over a period of eleven months.

In 1909 Shine[2] reported a case in which he used sixty milligrams of

radium for five minutes. Eight treatments were given over a period of two months. In 1916 he[3] used twenty milligrams for twenty to thirty-five minutes at intervals of two weeks.

Pusey[4] gives his technique as used with excellent results in several cases. He everted the lids with lid forceps and passed the radium back and forth over the lid just short of contact. Five milligrams of radium covered with rubber dam were applied in this manner for five minute periods for six successive days. After an interval of several months this was repeated, some cases requiring four series.

Shumway[5] used radium therapy successfully in four cases in 1919. Fifty milligrams of radium inclosed in five millimeters of aluminum was applied directly to the exposed conjunctiva for an average of fifteen minutes at intervals of two to four weeks, and in some instances three or four applications were given. This is a large dose, and most of the patients showed some skin reaction in the form of erythema of the lids and loss of lashes, the latter, however, growing back in every instance after several months.

Tousey[6] in 1924 reported a dozen cases treated successfully with radium. He used twenty-eight milligrams covered with rubber dam and applied it to the everted lids, the time of exposure being thirty-five minutes.

Laura Lane's[7] first case received fifteen milligrams of radium (unscreened) for ten minutes, once a week for four weeks. This was repeated after two months. In 1926 she[8] reported thirteen cases treated, with good results in ten, fair in two, and no result in one.

From the above it is apparent that there is great variance as to the dosage of radium used.

In reporting these cases we are indebted in several instances to Dr. W. S. Franklin for the use of his records.

We have been guided by the advice of Dr. L. R. Taussig of the department of dermatology as to the dosage and screening.

Case no. 1: Ernest P., aged twelve years, reported September, 1922, with a typical bilateral vernal catarrh of the palpebral type. Radium in the form of radium barium sulphate containing 9.95 milligrams of radium element was applied in a circular gold plated glazed plaque, over an area of 0.5 square centimeters. This was screened with 0.5 millimeter of silver and applied for one hour over the closed lids at a distance of 1.2 centimeters. This was repeated twice a week to each eye for a period of two months, and then once a week for the next seven months. Following this the radium was applied every two weeks for another two months. At the end of this time the condition was cleared and there has been no recurrence since.

Case no. 2: Lionel V. D., aged eleven years, was referred to Dr. Franklin by Dr. A. C. Macleish of Los Angeles, who felt the cooler climate of San Francisco would have a beneficial effect on this boy's aggravated case. Radium had been applied, but had been discontinued after a severe reaction. October 19, 1925, radium therapy was instituted twice a week to each eye, the those in case 1. The condition imdosage and method being identical with proved very materially the first two months, probably in part as a result of the change in climate. Following this the improvement was very slow. We advised a stronger dosage, and on April 13, 1926, applied the above plaque of radium, screened only with rubber dam, directly to the everted lids for a period of one minute. April 23 the other eye was similarly treated. On June 21, 1926, the same procedure was repeated on each eye. There was no acute reaction following this type of application. The patient returned to Los Angeles the latter part of June. On September 11, 1926, Dr. Macleish wrote: "the lids are decidedly better than when he went to you, but there are several nodules still present".

Case no. 3: Richard B., aged thirteen years, was seen May 30, 1926, with a typical vernal catarrh of a severe type of sixteen months duration. May

10 a capillary tube 1.2 centimeters long containing one hundred millicuries of radon was applied unscreened for five seconds directly to the everted lids. This was followed by a mild reaction. Two weeks later the condition showed a definite improvement. June 3 (a month after the first application) eighty-two millicuries in a capillary tube, unscreened, was applied for seven seconds. The condition continued to improve and on October 2 showed only a few follicles remaining. At this time a third application of eighty millicuries was made in a similar manner for five seconds. December 20 the condition was entirely cleared. The patient returned February 21 for observation, and showed no evidence of recurrence.

Case no. 4: Robert R., aged twelve years, came June, 1927, with a bilateral vernal catarrh of two and a half years duration. The above radium plaque of 9.95 milligrams screened with rubber dam was applied directly to the everted lids for ten seconds once a week for a month. At this time the improvement was slight and it was decided to give a larger dose. The same plaque screened as before was applied for forty-five seconds. This was repeated a month later. Two months later there was no evidence of the disease and there has been no sign of recurrence up to the present time.

Case no. 5: David M., aged eleven years, was seen July 5, 1927, with a bulbar vernal catarrh of two and a half years duration, but of a relatively mild type. A ten milligram plaque screened with rubber dam was applied directly to the lesions for a period of thirty seconds. This was repeated once a month for four months. A month later the condition was entirely cleared.

Case no. 6: Randolf S., aged ten years, reported March 31, 1927, with a marked bilateral vernal catarrh. The symptoms were so marked that he had been unable to attend school. He was given ten milligrams of radium (plaque) applied to the everted lids for thirty seconds and screened with rubber dam. This was done once a week for a month. At the end of this time there was a definite improvement but he still showed numerous follicles. At this time (August 3) a 1.5 centimeter capillary tube containing sixty-eight millicuries of radon was applied unscreened to the everted lids just short of contact and moved slowly back and forth over the diseased area. The time of exposure was ten seconds. There was no reaction following this, and a definite improvement was noted in two weeks. A month later the left eye showed no evidence of the vernal catarrh, while the right eye still had a few follicles. The patient failed to return until February, 1928. At this time the condition remained unchanged and another application of radium was made.

Comments: All the patients treated were males between the ages of ten and thirteen years. Five had the palpebral type and one the bulbar type of vernal catarrh.

In the first case small doses were used with considerable screening and distance, and the lesions, even though relatively mild in type, required eleven months to attain a cure. In the second case the radium was beneficial, although it did not produce complete clearing of the condition. We feel that had larger unscreened doses been used (just below the reaction point) the result would probably have been better. In the third case the unscreened radon applied by direct contact produced a marked improvement but gave a mild reaction, although not severe enough to produce a loss of lashes. In the sixth case the dose was slightly larger, but the radon was applied just short of contact. This produced no reaction but gave satisfactory results.

We feel that the unscreened radium produces the best results, as it gives a maximum of the superficial rays. The 1.5 centimeter capillary tubes, because of their size, are most convenient. A dosage of six to seven hundred millicurie seconds will not give a reaction if applied just short of contact and slowly moved back and forth over the lesions. To guard against the possibility of atrophy, scarring, and telangiec-

tasis, an erythema dose is to be avoided.

Where an erythema has been produced, there is apt to be atrophy and the development of telangiectasis of the skin of the lids and conjunctiva, which at times does not make its appearance until a year or more following the treatment. This applies particularly where screened radium is used, as in these cases the reaction is due to the more penetrating rays.

Case no. 2, which had previously had an erythema dose of unknown quantity and quality, theoretically should not have had more radium. We feel that the importance of avoiding a reaction can not be overemphasized.

In view of Lane's[8] experimental work it seems wise not to use the unscreened radium in the bulbar type of the disease, as it is prone to produce damage to the globe more readily than the screened radium. For this reason also a smaller dose seems advisable.

We agree with Pusey that "results are so gratifying in these otherwise intractable cases and the treatment so easy" that radium therapy in vernal catarrh is worthy of wider application than it has received.

384 Post street.

Bibliography

[1] Davidson, MacKenzie, and Lawson, Arnold. Trans. Ophth. Soc. United Kingdom, 1909, p. 239.
[2] Shine. Arch. of Ophth., 1919, v. 39, p. 145.
[3] Shine. Arch. of Ophth., 1916, v. 46, p. 67.
[4] Pusey, W. A. our. Amer. Med. Assoc., 1918, v. 71, p. 806.
[5] Shumway. Pennsylvania State Med. Jour., 1919, Sept., p. 793.
[6] Tousey. New York State Med. Jour., 1924, v. 24, p. 193.
[7] Lane, Laura A. Trans. Sec. Ophth. Amer. Med. Assoc., 1924, p. 176.
[8] Lane, Laura A. Trans. Sec. Ophth. Amer. Med. Assoc., 1926, p. 78.

TEST LETTERS WHICH COMPLY WITH THE PHYSIOLOGICAL REQUIREMENTS OF A VISUAL TEST OBJECT

ALFRED COWAN, M.D.

PHILADELPHIA

Attention is called to the failure of ordinary type to satisfy the physiological requirements of a test for visual acuity; and suggestions are made as to choice and design of letters of equal legibility. Read at the annual meeting of the American Ophthalmological Society, Washington, D.C., May 2, 1928. See also page 657.

Visual acuity is measured by the smallest angular distance under which two points still appear to be separated. This apparent distance varies according to different investigators; but it is generally agreed that in normal visual acuity the distance between two objects that are barely distinguished as two may be assumed to subtend an angle of one minute at the eye. This is the "angle of distinctness" or "minimum visibile."

Actually, the visual angle is a solid angle having a circular base and its apex at the nodal point. The ideal test object, therefore, would be circular. Round dots may be, and have been, used as a simple test for measuring the visual acuity; but, since, if bright enough to stimulate a sensitive retinal element, an object may be perceived under an angle much smaller than the smallest angle of distinct vision, dots are objectionable because they serve as a photometric test and not as a test of the distinctness of vision. A white dot on a black ground, when sufficiently illuminated, will be seen under a much smaller apparent distance than would be subtended by the smallest angle under which two points could be distinguished as two; while a black dot on a white ground may disappear by irradiation from the

surrounding white under strong illumination. The perception of a dot is a different and less restricted retinal function than the ability to distinguish two points as separate points, and visual test objects should be so constructed that they measure the form sense and not the brightness sense.

The same objection to dots as objects for the determination of the visual acuity may, to a certain extent, be offered to such tests as that of Guillery, Landolt's "broken ring," and Ewing's "uniform visual test object," because the patient is asked only to locate the object or break and not to distinguish its form. A little practice with a test of this kind would enable an intelligent person to give answers that would indicate a much higher visual acuity than he actually possesses.

Many workers have used parallel lines and gratings in their investigations of the acuteness of vision, but such tests are entirely subjective and of limited value for practical use. Charts consisting of parallel lines with intervals of the same width have been arranged for the clinical determination of the visual acuity; and the same principle was used by Snellen, and has been used by others after him, in the form of a nonserif capital letter **E** turned in different directions, the patient being required to tell the direction of the bar and arms. The bar of this **E**, however, is shorter than the arms and the patient is aided in his ability to denote the direction of the letter by its general outline.

The figure resembling the nonserif capital letter **E** with the bar removed, thus making the space between the arms subtend three minutes, is a poor test object from the physiological standpoint. In spite of its unsuitability as a test object this figure—nothing more than the broken square of Snellen—was used by de Wecker, later by Steiger, and still later by Oliver. The similar figure by Jackson, three minutes in height with a one minute space between the arms, is more nearly correct.

Many attempts have been made to construct a so-called universal test object; but, except in the case of illiterates, letters and numerals offer the best objective means of testing the visual acuity. This is true even though it has been rightly shown that many psychic and other factors affect the findings to such an extent that the result is only a relative one.

In order that a letter may comply with the physiological requirements of a test object it is necessary that the breadth of the solid lines, as well as the breadth of the spaces between them, shall always subtend an angle of one minute at the distance at which the letter is meant to be seen by a normal eye. The five-minute angle for the size of the whole letter was arbitrarily chosen by Snellen for convenience, but has no physiological significance.

No letter such as A, F, I, J, L, P, T, V, X, or Y, that may be recognized by its outline, is a fair visual test object. A letter may be known by its general form even though its parts are indistinct.

None of Green's series of half-serif letters, and only **E** and **B** in the so-called Gothic or nonserif letters as usually constructed, conform to the one minute principle. The only letters

Fig. 1 (Cowan).

on Snellen's test cards which meet the necessary requirements of a test object are B, E, H and R, and he seldom used H. The only other letter of this style —block capitals with serifs—which lends itself to proper construction is D. But the Gothic or nonserif letters **B, C, D, E, H, O, R, U,** and **S,** (Figure 1) can be modified—without loss of identity—to conform to the proper

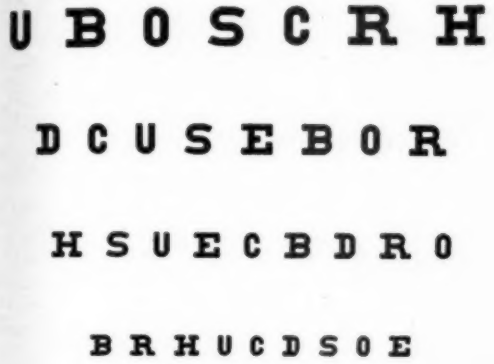


Fig. 2 (Cowan).

dimensions, and there is no reason why a test card should not be made up of more than one style. The serif letters B, D, E, H, R and the nonserif letters **C, O, S, U** were chosen for such a card (Figure 2).

The letters B, E and R (Figure 3)

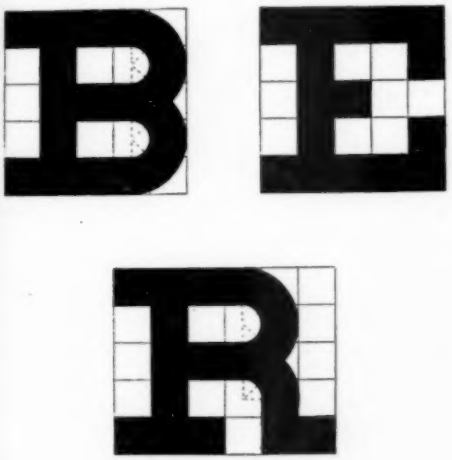


Fig. 3 (Cowan).

do not vary from the original Snellen form, except that the curves in the B and the R are drawn so that the thickness is everywhere the same—both edges of the solid line having a common center. The B and the R make perfect test objects. The right hand external corners of the arms of the E are each more than one minute angular distance from the nearest opposite point, but these small faults are considered an insufficient reason for rejecting such a useful letter.

Fig. 4 (Cowan).

The letters **C, O,** and **U** (Figure 4) are each contained in a rectangle three minutes in width by five minutes in height, in order to make the open space subtend one minute in width. The D is modified in the same way, but is wider by the one minute serifs.

In the H (Figure 5) the inner serifs subtend a half minute in order to keep the letter as narrow as possible. The **S** is entirely reconstructed to conform to the one minute principle.

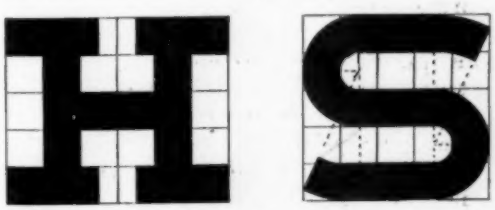


Fig. 5 (Cowan).

Excepting the two points in the E, each of these nine letters is so constructed that for any point in the letter

there is at least one opposite point under an angular distance of one minute.

Letters such as these, each one carefully drawn to comply with the physiological requirements of a visual test object, and none of which can be recognized by its general outline, should be equally legible.

With a test card composed of letters of equal legibility there would be no occasion for such notations of the visual acuity as 6/6+2 or 6/5—. Take, for example, the line of type

A P E O R F D Z

meant to be seen at a distance of six meters. Of these eight letters only the R and the E are proper test objects. A person reading all the letters except R and E might be recorded as having a visual acuity of 6/6—2, when as a matter of fact his failure to distinguish these letters would be an indication that his vision was not 6/6 at all.

In conclusion it is proposed that test cards for the determination of the visual acuity be composed of letters which conform to the physiological requirements of a visual test object.

2007 Pine street.

ACUTE RISE OF TENSION FOLLOWING THE USE OF ADRENALIN IN GLAUCOMA

S. R. GIFFORD, M.D., F.A.C.S.

OMAHA

Adrenalin or glaucosan, while of definite value in chronic simple glaucoma, is contraindicated in acute glaucoma, in inflammatory and hemorrhagic glaucoma, and in absolute glaucoma, and also in glaucomatous iritis. The danger of provoking acute glaucoma is due to the incidental mydriasis, which should be prevented or minimized by free use of miotics before and after adrenalin treatment. From the Department of Ophthalmology, University of Nebraska Medical College.

The use of adrenalin has in my experience proved of considerable value in the treatment of chronic glaucoma, and the purpose of this essay is not to discourage its use, but to point out one important danger connected with it, and a means of minimizing this danger to which I believe not enough attention has been called.

Since the work of Hamburger in 1923, it is generally known that adrenalin, while having no effect on the pupil or tension when dropped into the normal eye, does, when injected subconjunctivally, produce dilatation of the pupil with marked decrease in intraocular tension. Hamburger's recent work has pointed out the advantages over adrenalin of two preparations which have been made at his instigation. Glaucosan is dextrorotatory adrenalin with the addition of an optically inert substance formed in its manufacture. It has the advantage of not raising the blood pressure, but like adrenalin must be injected. "Glaucosandrops," or Linksglaukosan, is ordinary levorotatory adrenalin prepared in a two per cent concentration plus the same optically inert component, and in this concentration is effective by instillation.

After having used subconjunctival injections of adrenalin for some time, I tried the simple method suggested by Gradle of using a cotton pledget soaked in adrenalin and placed in the upper cul-de-sac. Since this proved as effective as injections, it has been used almost exclusively, glaucosan having been tried in only a few cases. After two instillations of two per cent butyn, the pledget, on which has been dropped four minims of adrenalin 1 to 1000, is placed in the upper cul-de-sac and left three minutes. A fall of tension is usually noted within one to two hours, and after twenty-four hours the tension is often as low as ten to twelve mm. (Schiøtz). It gradually rises to

about normal within the next day, and often returns to its previous level above normal within a few days. In a fair number of cases, however, it may be kept normal for much longer periods by the use of eserine which had previously not been effective. Vannas, who has published a most careful analysis of a series of cases so treated, found that the normalization of tension lasted in one-third of his cases only one day, in one-third two to three days, and in one-third over three days.

In the early papers of Hamburger and other authors who reported on the use of adrenalin, the dilatation of the pupil was apparently considered an essential part of the result, and not a drawback. The traditional fear of a dilated pupil in a patient with glaucoma, however, prompted me to use eserine before and after the injection in an attempt to minimize the mydriasis. The same effect on tension was obtained as without the eserine. I have seen four acute attacks of glaucoma following adrenalin packs or injections, two of which were especially dramatic as each occurred in the patient's only useful eye; and these experiences have prompted further efforts to minimize the mydriasis as much as possible.

Mr. B., a man of 58 years, had one eye blind from detachment, and the other with vision of 20/20, but tension of 32 mm. (Schiøtz), in spite of the use of eserine. An adrenalin injection was given, eserine having been used previously. Without waiting for the effect of the injection to be watched, he left the office, returning two hours later in pain, with widely dilated pupil, and tension of forty mm. Eserine was not effective and paracentesis was performed with temporary relief. Six hours later I was called to his room, to find the eye very hard, cornea steamy, and vision reduced to hand movements. Eserine was given, and he was taken to the hospital with the idea that immediate operation would be necessary. After an hour, however, the cornea was clearer, and by the use of a purge and morphine, with frequent instillations of eserine, the tension was reduced to thirty-two mm. by morning, and to normal by the following night. Eserine was then successful in keeping the tension down for two weeks, when it rose to forty-four mm., and iridotasis was performed with good result. Ten months later the tension was nine mm. (Schiøtz), and vision was 20/20.

Mrs. S. was a patient with simple glaucoma in whom eserine, at first effective, had become less so, the tension remaining about thirty-five mm. (Schiøtz). The other eye was blind, with tension of seventy mm. An adrenalin pack was given in the better eye with every precaution. Eserine was used before the pack, and was repeated several times for an hour afterward. The pupil being only slightly larger than normal, she was allowed to go home, with instructions to use eserine an hour later, and to repeat it if the pupil became enlarged. An hour after leaving the office the eye became very painful, halos appeared around the lights, and vision decreased to ability to recognize large objects. This attack persisted for three hours, in spite of the repeated use of eserine, but finally subsided, and two days later tension was fourteen mm. (Schiøtz) and vision normal as before.

These two are the only definite attacks of acute glaucoma I have seen out of about one hundred adrenalin treatments in patients with chronic simple glaucoma, which is the type in which the method has most often been used. I have had several others, however, complain of more or less severe pain coming on some hours after the treatment, without marked impairment of vision, and these were possibly mild and transitory attacks. In other types, especially secondary and inflammatory glaucoma, the following experiences have discouraged the use of adrenalin.

A man with glaucoma secondary to injury, with a fragment of copper in the globe, came in showing an inflamed and painful eye, the tension being sixty mm. The eye had no light perception, and enucleation was proposed. Since the patient wished to de-

lay this, an adrenalin injection was tried to control the tension. This resulted in a further increase of tension coming on one hour after the injection, with very severe pain requiring morphine for its control, and lasting twenty-four hours, till enucleation was performed.

A luetic patient who had been under treatment for nephritis for years, developed acute glaucoma in one eye resulting in blindness some months before I saw him, and then in the other. After temporary relief from a trephining, the tension rose again to forty mm. and an adrenalin pack was tried, the pack being left in five minutes instead of three. In spite of the use of eserine before and after, the tension was unchanged an hour afterward, and severe pain was complained of, lasting, in spite of narcotics, most of the night. The tension subsequently fell to twenty-seven mm., where it remained several days.

The earlier authors reporting on the use of adrenalin agreed that it was ineffective in absolute glaucoma, but Hamburger and Thiel recommended it especially in glaucoma complicating iritis and Rentz obtained his best results in such cases, where the mydriasis would present obvious advantages. Wegner, using glaucosan, saw good results in two out of six similar cases, but bad effects in two of the others.

Gradle, in 1924, reported that adrenalin was of most value in glaucomatous iritis, of possible value in acute inflammatory glaucoma (one case), and of little or no value in chronic simple glaucoma. Thiel cautions against its use in hemorrhagic or inflammatory glaucoma. Jess, Seefelder, Marchesani, and Hildesheimer saw attacks of acute glaucoma follow the use of adrenalin in serous iritis. In inflammatory glaucoma Vannas saw reduction of tension in two, no effect in two, and increase of tension in five eyes. In glaucomatous iritis, he obtained no good effect, two showing no effect and three showing increase of tension, which in one case amounted to twenty mm. He saw an increase of tension altogether in eleven eyes and only one of these was in a case of simple glaucoma. He concludes that adrenalin is of no value, may do harm in eyes that are inflamed, and is indicated chiefly in primary simple glaucoma.

As stated, only one of Vannas' thirty-four cases of simple glaucoma showed a significant rise of tension, and relatively few cases of such an occurrence in simple glaucoma have been reported. Hamburger, in 1926, stated that rise of tension did not occur after glaucosan drops, but later in the same year he reported an attack of acute glaucoma in which cocaine instead of holocaine had been used for anesthesia before treatment. This was controlled by a powerful miotic which he calls amin-glaucosan (a misleading name, as the drug histamin is in no way similar to glaucosan, being derived from ergot). In another recent article, he mentions the use of eserine to guard against attacks of glaucoma from adrenalin.

Hegner, in two out of fourteen cases of simple glaucoma in which he tried adrenalin, saw severe attacks of acute glaucoma, which subsided without permanent ill effects. Stock saw three such attacks among twelve cases in which adrenalin was tried, and warns against its use on that account. Rentz also mentions seeing several acute attacks. Löhlein saw an increase of tension follow adrenalin in ten cases, in four of which this amounted to an acute attack of glaucoma. Elschnig saw several rises of tension in spite of the use of miotics. Ring quotes H. Gifford's reported case of acute glaucoma following the use of adrenalin in anesthesia, and advises miotics after it is used.

It must be remembered that a slight and transitory rise of tension does occur fairly often after adrenalin. Vannas noted it in ten cases in which it was followed by a notable reduction below the previous level. These slight increases, while offering no inconvenience to the patients, occur in the first hour or two after treatment, during the time of maximal mydriasis, and are probably, as Vannas believes, due to the mydriasis. The greatest reduction of tension, on the other hand, occurs

usually after twenty-four hours, when the mydriasis has subsided, and so can not be due either to the mydriasis or to the primary constriction of the uveal vessels, which lasts only a few hours. It must be due to changes in the eye set up by this change in the vessels, and Hamburger believes that the secondary vasodilatation which follows the vasoconstriction is the responsible factor.

In any case, there would seem to be no good reason why an attempt should not be made to control the mydriasis of adrenalin. Vannas found that the mydriasis occurred in spite of miotics, but he does not state how often these were employed. When eserine is used twice at five minute intervals before adrenalin treatment, and repeated every twenty minutes for the first hour and every half-hour for the next two hours, a slight dilatation may occur but the pupil is seldom over four mm. in diameter, and often mydriasis is prevented altogether. It is sometimes prevented by considerably less eserine, but one of the cases of acute glaucoma here reported occurred after almost exactly this routine, the mydriasis being uncontrollable.

There are undoubtedly persons who are hypersensitive to adrenalin, and, as Knapp has shown, glaucoma patients are especially apt to fall in this class. Since we can not foresee which person will be thus hypersensitive, it seems safest to treat every patient as potentially such a person. Hence the practice of giving patients adrenalin in the form of 1 to 1000 ointment to use at home, as Thiel recommended, seems dangerous. The only safe practice, apparently, is to watch every patient for at least two hours after treatment, to give as much eserine during that time as is necessary to keep the mydriasis at a minimum, and to instruct patients to use it during the next few hours every half hour or every hour as the size of the pupil seems to require. It has never been my experience to see any damage to an eye with simple glaucoma result from too much eserine.

Conclusions

(1) Adrenalin (or glaucosan) is of definite value in chronic simple glaucoma, as an adjuvant to other remedies. It is dangerous in eyes in an inflamed state and in eyes with damaged vessels, and hence it is contraindicated in acute glaucoma, in inflammatory and hemorrhagic glaucoma, and in absolute glaucoma.

(2) In the light of the author's experience and that of others, notably Vannas, it is also contraindicated in glaucomatous iritis, in which condition it seemed theoretically to offer so much promise.

(3) The danger of provoking acute glaucoma is due to the mydriasis.

(4) There is more danger of provoking such attacks even in simple glaucoma than previous reports would indicate, and they should be watched for.

(5) Mydriasis should be prevented or minimized by the free use of miotics before and after adrenalin treatment.

1620 Medical Arts building

Bibliography

Elschnig. Zeit. f. Augenh., 1926, v. 60, p. 373.
Gradle. Amer. Jour. Ophth., 1924, v. 7, p. 851.
Jour. Amer. Med. Assoc., 1925, v. 84. p. 675.
Hamburger. Klin. M. f. Augenh., 1924, v. 72,p. 47.
Klin, M. f. Augenh., 1926, v. 76, p. 400.
Klin. M. f. Augenh., 1927, v. 79, p. 189.
Arch. of Ophth., 1926, v. 55, p. 533.
Hegner. Zeit. f. d. ges. Ophth. u. i. Grenzgeb., 1924, v. 12, p. 309.
Knapp. Arch. of Ophth., 1921, v. 50, p. 556.
Löhlein. Klin. M. f. Augenh., 1926, v. 77, p. 1. (Beilageheft)
Rentz. Klin. M. f. Augenh., 1924, v. 73, p. 356.
Ring. Amer. Jour. Ophth., 1925, v. 8, p. 553.
Stock. Zent. f. d. ges. Ophth. u. i. Grenzgeb. 1924, p. 309.
Thiel. Arch. f. Augenh., 1925, v. 96, p. 34.
Vannas. Acta Ophth., 1927, v. 4, p. 340.
Wegner. Zeit. f. Augenh., 1926, v. 60, p. 156.
For other references on adrenalin see Vannas.

DIAGNOSIS AND TREATMENT OF INCIPIENT GLAUCOMA

R. J. Curdy, M.D., F.A.C.S.

KANSAS CITY, MISSOURI

The earliest symptoms of chronic glaucoma are not noticed unless their investigation forms part of a routine examination. Characteristic changes in discs, fields, and tension, and some points in treatment are here considered. Read before the Kansas City Eye, Ear, Nose, and Throat Society, February 16, 1928.

Until recently the immense amount of effort given to the problems of glaucoma has been devoted almost entirely to the fully developed and advanced stages. Now, however, the incipient stages are receiving more adequate attention, and it is probable that progress during the next few years will be most marked in diagnosis and treatment of the early periods of the disease.

The natural result will be earlier recognition of the disease, earlier treatment, and less blindness from glaucoma. As in other diseases, treatment is more effectual in the early than in the late stages. This is especially true of glaucoma, since any impairment of function which it has produced is permanent. The best we can hope to do is to preserve the measure of vision which the patient brings to us.

Reviewing briefly a part of the work recently done in this field, we find attention called to the great amount of blindness caused by glaucoma, to the need of early diagnosis and treatment if this blindness is to be diminished, to the fact that we do not, generally, make the diagnosis and institute treatment until the disease is fully developed and has done permanent damage; to some new methods of diagnosis and treatment; and to new variations of old methods.

In a paper entitled "Can loss of vision due to glaucoma be checked?" Derby[1] says that glaucoma causes one-third to one quarter of the blindness occurring after forty years of age, though early diagnosis and treatment would prevent blindness in many cases.

He suggests education of the public as to the significance and dangers of glaucoma, since in the Harvard series of popular medical lectures one on glaucoma by Waite resulted in a number of people making diagnoses on themselves and putting themselves under treatment. He deplores the proneness to neglect the progress of the disease as long as central vision remains good, for impairment of central vision is a late symptom, and rarely occurs until there has been extensive loss of peripheral vision. From this he urges routine use of the perimeter as well as the tonometer in patients over forty years of age.

Haden[2], urging the importance of hypertension as the earliest symptom of glaucoma, says that measurement of the intraocular tension should be included in every routine examination of the eyes because all the classical symptoms of glaucoma are results of tissue changes brought about by hypertension, and are not of sufficient intensity to be recognized until permanent tissue destruction has taken place. The hypertension exists a long time before any demonstrable symptoms develop, hence it is rational to discover the hypertension before symptoms appear.

These are timely and reasonable suggestions, and undoubtedly will in time be generally adopted. The chief obstacle to the routine measurement of fields and tension is the time required for such painstaking measurements, with consequent tiring of patient and physician. It might be practicable to limit field measurements to the nasal half, since this is the first affected, and the defect can be extensive without exciting the patient's notice.

Studies of the effects of epinephrin in eyes with glaucoma indicate that this remedy is destined to have an established place in both diagnosis and treatment, though its total action is not yet sufficiently well defined for routine usefulness. The mydriatic ef-

fect of epinephrin is apparently limited to eyes with hypertension or with a tendency to hypertension, and, contrary to other mydriatics, its mydriasis is not usually accompanied by increase in tension, more often by decrease.

Of sixty-five cases of primary glaucoma Knapp[3] found that instillations of adrenalin produced mydriasis in sixty while the tension was unchanged in forty, diminished in twenty, and increased in five. Schoenberg[4], testing thirty-five sons and daughters of parents having primary glaucoma, found the Knapp reaction positive in fifty per cent, strongly so in twenty per cent. Thiel[5] found that epinephrin caused a fall of tension in the course of twenty-four hours in most cases, but caused acute hypertension in cases with marked vascular disease, in absolute, hemorrhagic and chronic inflammatory glaucoma.

Hamburger[6], in the work leading to his "glaucosan" drops, worked on the theory that glaucoma was caused by relaxation of the vasoconstricting mechanism, resulting in relaxation of the blood vessels and repletion of the eye with blood, the choroid of course being most affected. He treated glaucoma simplex with subconjunctival injections of suprarenin, in doses of 0.5 c. c. of the 1 to 1000 solution, succeeding very well even where miotics had entirely lost their effect.

This treatment has the disadvantage of causing increase of the general blood pressure, rapid pulse, and collapse. With the "glaucosan drops" these effects do not occur, and the solution can be used in high concentration and with marked effects. The eye becomes marble white, the opening of the lids is enlarged, the pupil dilates, the skin of the lower lid shows pallor, and the eye softens and remains so for several days.

Gradle[7] has found subconjunctival injection of adrenalin useful in acute glaucoma, and for making miotics effective in cases with insufficient effect from operation, but "not particularly indicated in simple glaucoma".

Reports of others on the effects of epinephrin vary. Generally, beneficial though transitory results have been obtained in about fifty per cent of the cases. The impression one gets is that the drug is useful in simple chronic glaucoma to make miotics more effective, and to reduce tension preliminary to operation, but that it is dangerous in acute or inflammatory glaucoma when there is reason to suspect vascular disease. Accepting the theory that the favorable effect of epinephrin on ocular hypertension is due to its power to stimulate constriction of the intraocular vessels, it is easy to understand how this effect on diseased vessels could result in disastrous hemorrhage or secondary relaxation.

An interesting observation in relation to epinephrin is that of Richter[8], who found that insulin was the natural opponent of adrenalin, producing increase of intraocular tension in rabbits by either subcutaneous, intramuscular or intravenous injection. In the case of a patient having diabetes a violent attack of glaucoma accompanied the administration of insulin, and yielded to miotics only after the insulin was stopped.

It has been rather generally assumed that glaucoma does not occur in myopic eyes, but Knapp[9] reports thirty-five cases, all of glaucoma simplex, and all giving good results from operation.

Diminished light sense and slow adaptation to change of intensity of light are conspicuous in advanced glaucoma, complaint being frequently made of inability to see on coming from the strong light of the street into the relatively dim light of buildings. Waite, Derby, and Kirk[10] report experiments on the light sense, finding retarded adaptation rate and increased threshold in glaucoma suspects as well as in established glaucoma. They think these changes in the light sense occur before any hypertension or cupping of the disc or alteration of the fields. To elicit these early changes a complicated apparatus is required, for accurate control of wide changes of light without chromatic change.

These observations are all of great value in giving a better comprehension of the clinical pathology and therapeutics of glaucoma. In our clinical work, however, we must still rely for both diagnosis and treatment of early glaucoma on the three cardinal symptoms, cupping of the disc, changes in the visual fields, and hypertension; above all hypertension, for that is the only part of glaucoma we can influence by any form of treatment.

Paracentral scotomas rarely occur early in the disease, probably never until there is permanent anatomical damage shown by cupping of the disc and contraction of peripheral vision.

Marked pain does not occur early in simple glaucoma, but slight aching or asthenopic discomfort may be the first symptom. A patient in my care had ocular discomfort of the asthenopic type completely relieved by the daily use of pilocarpin solution continued for several years. No other symptom suggestive of glaucoma was present except occasional appearance of rainbow halos around lights. This was before the tonometer had come into use. At a later examination, twelve years after beginning the treatment with pilocarpin, the tonometer (Schiøtz) showed the tension to be 36 mm. Hg. in the right eye, 42 mm. in the left.

Hypertension of low degree can exist a long time without other symptoms, and can be absent when the other symptoms are well advanced. Beard and Brown[11] have recently reported a case having cupped discs, contracted fields, and arcuate scotomas, but with normal tension, 18 mm. Hg. The tension was not affected by eserin nor by atropin.

Of the three cardinal symptoms, the one that has been most thoroughly determined is that of changes in the visual field, consisting of concentric contraction greatest and earliest in the nasal field, the Seidel symptom of enlargement of the blind spot toward the macula, the Bjerrum symptom of arcuate scotoma, and the Rønne step. It only remains to devise some way to determine the presence of these changes without the inordinate time required by present methods.

The tonometer is not yet used in practice as much as it merits. The extreme precision required in its application, together with the variations of ocular tension, have given it a reputation for being unreliable. The more it is used, however, the more dependable does one find it, and the more certain does one become in interpreting the findings.

Thiel[12], in the Jena clinic, has made systematic observations of ocular tension with special reference to variations. Difference in the morning and evening tension was almost entirely lacking in normal eyes, but in glaucoma the tension fell during the day from the highest point between five and seven a.m., and rose again during the night. Difference of morning and evening tension, and also difference of tension of the two eyes, he regards as indicating a tendency to glaucoma.

Thiel also found the tension influenced by passive congestion of the head, and by changes of bodily position. After caffeine, the glaucomatous patient shows both increase of general blood pressure and a rise of several millimeters in the ocular tension. In the horizontal position in bed the glaucomatous patient shows absence of the usual lowering of tension during the day, or sometimes an actual increase.

A fundamental fact in clinical tonometry is that in normal eyes there is no variation in tension except within very narrow limits, while in glaucoma the tension is not only above the normal but shows decided and characteristic variations. In actual practice hypertension is the symptom of predominating importance, for our treatment consists entirely in attacking the hypertension. It is an old observation that hypertension is not the whole of glaucoma. But the fact remains that it is the only part of glaucoma that we can certainly influence by any treatment.

It is probable that in the majority of cases the diagnosis of glaucoma is

first made by observation of changes in the disc. When the characteristic cupping exists there is no doubt of the diagnosis, and usually the other symptoms will be found present. But in this stage the disease has existed a long time, and permanent damage has occurred. Little has been done to establish what are the earliest appearances of the disc which may be depended on to indicate incipient glaucoma.

In routine ophthalmoscopic examination of refraction cases many are seen having more or less depression of the disc surface. Usually the depression is slight though definite, and the disc surface normal; the depression extends to the disc margin as a gradual slope, not as an abrupt depression; and the vessels curve over the disc margin, but the curve is not a sharp one.

I have never seen glaucoma develop in these cases, though I have made observation of this disc condition a part of ophthalmoscopic routine for many years. When a depression of the disc, however shallow, shows abruptly at the disc margin, with sharp bending of vessels as they cross the margin, and there is some gray discoloration of the disc surface, it is probable that there is incipient glaucoma, and that careful search will elicit other symptoms.

The physiological cup is more conspicuous, and is more likely to be noticed and to suggest the presence of glaucoma, especially in those cups with sharply defined and abrupt margins and with exposure of the cribriform fascia. We see glaucoma so often in eyes with the physiological cup that we may think the latter indicative of a tendency to glaucoma. The impression from limited observation is that the physiological cup has no significance if the disc surface between the cup and the disc margin is normal in color and not depressed below the level of the surrounding retina.

But if the margin of the cup is depressed so that the disc surface shows a decided slope from the cup margin to the disc margin, hypertension is probably present; still more probable is hypertension if there is also sharp depression at the disc margin. This impression is formed from seeing cases with advanced glaucoma in one eye and these disc conditions in the other.

The question now arises, how early it is possible to make a diagnosis of glaucoma sufficiently certain to justify treatment? We must avoid such an awkward situation as we occupy regarding trachoma, one physician making a positive diagnosis and the next scouting it, with the result that we are discredited and without control of the situation, and are without the measure of usefulness we should have.

A diagnosis of glaucoma should not be given to the patient if there is room for any doubt, for the patient will need to be told with all emphasis of the horrors of glaucoma and the need of treatment for life. Only after this is he to be given the greatest possible encouragement for hope from long continued treatment, or operation, or both. This should not be done if the diagnosis is not certain, and yet in the doubtful cases there should be sufficient admonition to the patient to prevent neglect.

The routine use of the tonometer in the older patients could soon bring about a knowledge by the public of ocular hypertension, similar to the present knowledge of vascular hypertension, which is recognized by patients as a condition requiring continued attention, but does not excite visions of impending death.

Few of us would now be willing to make tonometric and field measurements except in cases showing some rather definite suggestion of glaucoma. But we may accept certain suggestive symptoms as being imperative indications for detailed examination to the end of determining that incipient glaucoma is or is not present. Such symptoms are, suspicious appearance of the disc, shallow anterior chamber, complaint of rainbow halo around lights, aching or other symptoms of asthenopia not relieved by usual measures. In addition, it would be well to make at least one tonometric measurement every day as a matter of habit.

We frequently make an ophthalmoscopic examination for no very definite reason, because it is easy to make, and often such examination reveals something important which would otherwise be overlooked. Once one gets in the way of doing it, the use of the tonometer is as easy as that of the ophthalmoscope and no more time-consuming.

Does hypertension with no other evidence of glaucoma warrant the diagnosis of glaucoma? I think not, but it most emphatically calls for miotic treatment and long continued observation. Hypertension of very low degree may never cause other symptoms, for some eyes have a higher tolerance of tension than the accepted normal. Hypertension of considerable degree will always produce other symptoms in a short time.

Having made the diagnosis of incipient glaucoma, what are we to do? Glaucoma is not a disease that runs its course and recovers; it is there for the rest of life and requires lifetime treatment. The great obstacle to this extent of treatment is the difficulty of inducing the patient to comprehend, and to keep at it constantly through the years.

This is especially difficult while the disease is incipient and without symptoms that impress the patient. It is easy at first to excite his fears and to start the needed treatment, but as months pass and nothing happens he gets careless and stops treatment. Again for some months nothing obvious happens, and he doubts the diagnosis until the progress of the disease brings symptoms he cannot ignore. We have then to deal with advanced instead of incipient glaucoma, and have lost part of our power to prevent blindness. This is a situation which calls for follow-up methods, periodically urging attention by the neglectful ones. Institutional patients will fare better than private ones, for the individual physician is averse to using follow-up methods.

Many cases of early glaucoma with hypertension of low degree and with slight field and disc changes can be kept stationary for years by miotic treatment. Larsen[13] reports a case with some cupping of the disc in which the tension was kept at twenty-six mm. Hg for seven years by the use of two per cent solution of pilocarpin three times daily. Eserin is more effectual than pilocarpin, but its overuse or long continued use is capable of harmful effects. I[14] have reported a case in which marked reduction of tension by eserin brought on hemorrhagic glaucoma, and another case in which long continued use of eserin produced posterior synechiæ, though the iris appeared normal.

Less serious is the conjunctivitis resulting from simple solutions of the miotics, but which frequently makes effective miotic treatment impossible. This can usually be prevented by making the miotic solution in the standard weak solution of zinc sulphate with boric acid. De Schweinitz and Baer[15] suggest for this purpose a solution of boric acid and sodium chloride, eighteen grains each, in four ounces of stronger rose water, this filtered until clear, and the miotic added.

Puscariu and Cerker[16] report remarkable reduction of tension without marked miosis from subconjunctival injections of pilocarpin in dose of 1/400 to 1/200 grain. This would be useful in certain emergencies but not for continued treatment. When such radical measures are needed, operation is to be preferred.

Since increase of tension during the night seems due to the horizontal position in bed, avoidance of this by sleeping in a reclining position may have material effect on tension, as it has in detachment of the lower part of the retina, by preventing gravitation of subretinal fluid toward the macula. I am trying this in suitable cases, but have not yet formed an opinion as to its value.

When hypertension is of considerable degree it can be materially reduced by miotics, but rarely to the normal limit. It remains so high as to be destructive. Operation is then necessary, and should be done as early as

possible, once its need is certain. Factors peculiar to glaucoma in the earliest stages and in young individuals make the response of these eyes to operative measures different from that of eyes with advanced glaucoma. In these early cases the eyes are practically normal, are especially free from the radical alterations of nutrition and resiliency which characterize the old cases, and in them the fistulizing operations are likely to produce overeffect, with a dangerous hypotonus impossible to correct. In such cases, simple iridectomy is the operation of choice rather than the fistulization so necessary in advanced cases.

A point in determining this eventuality is the reduction of tension caused by the weight of the tonometer. If the tonometer remains in position on the eye for as much as a minute there is some reduction in tension caused by continued pressure of the instrument. In old glaucoma the reduction is not more than two mm. Hg, but in early cases it is often as much as ten or twelve mm. It is in the cases showing great reduction that fistulization is prone to produce a disturbing overeffect.

1134 Rialto building

References

[1] Derby, G. S. Amer. Jour. Ophth., 1927, March, p. 178.

[2] Haden, H. C. Tonometric measurements in routine eye examinations. Texas State Jour. Med., 1926, v. 22, p. 326.

[3] Knapp, A. Action of adrenalin in the glaucomatous eye. Arch. of Ophth., 1921, v. 50, p. 556. Trans. Amer. Ophth. Soc., 1921.

[4] Schoenberg, M. J. The Knapp adrenalin mydriasis reaction in direct descendants of patients with primary glaucoma. Arch. of Ophth., 1925, v. 54, p. 282.

[5] Thiel, R. Influence of epinephrin on ocular tension in glaucoma. Arch. f. Augenh., 1925, v. 96, p. 34. (Ophth. Year Book, 1926, v. 22, p. 114.)

[6] Hamburger, C. Treatment of glaucoma with glaucosan, glaucosan drops, and amin-glaucosan drops. Arch. of Ophth., 1926, v. 55, p. 533.

[7] Gradle, H. S. Use of adrenalin in increased intraocular pressure. Amer. Jour. Ophth., 1924, v. 7, p. 851.

[8] Richter, A. Insulin and intraocular pressure. Klin. M. f. Augenh., 1926, v. 76, p. 835-840. (Ophth. Year Book, 1927, v. 23, p. 124.)

[9] Knapp, A. Glaucoma in myopic eyes. Trans. Amer. Ophth. Soc., 1925.

[10] Waite, Derby, and Kirk. Light sense in early glaucoma, achromatic scotopic threshold at macula. Trans. Ophth. Soc. United Kingdom, 1925, v. 45, pp. 301-333. (Ophth. Year Book, 1927, v. 23, p. 117.)

[11] Beard and Brown. Glaucomatous excavation of the nerve head and arcuate scotoma without hypertension. Amer. Jour. Ophth., 1926, v. 9, p. 46.

[12] Thiel, R. Physiologic and experimental results in intraocular pressure in healthy and glaucomatous eyes. Arch. f. Augenh., 1925, v. 96, pp. 331-354. (Ophth. Year Book, 1926, v. 22, p. 120.)

[13] Larsen, H. Medical treatment of glaucoma. Ugeskr. f. Laeger, 1925, v. 87, p. 775. (Ophth. Year Book, 1926, v. 22, p. 116.)

[14] Curdy, R. J. Action of miotic drugs on diseased intraocular structures. Amer. Jour. Ophth., 1923, v. 6, p. 22.

[15] De Schweinitz and Baer. Prolonged miosis for the control of increased intraocular tension, with remarks on the preparation of solutions of the miotics. Amer. Jour. Ophth., 1926, v. 9, p. 619.

[16] Puscariu and Cerker. Antiglaucomatous therapeutics. Ann. d'Ocul., 1925, v. 162, pp. 502-518. (Ophth. Year Book, 1926, v. 22, p. 116.)

THE MANAGEMENT OF ESTABLISHED GLAUCOMA

EDWIN N. ROBERTSON, M.D., F.A.C.S.

CONCORDIA, KANSAS

The author reviews, from a conservative standpoint, present day opinions as to the safest and most reliable lines of treatment of various types of glaucoma. Read before the Kansas City Eye, Ear, Nose, and Throat Society.

Most authorities are agreed that prompt intraocular operation is the most reliable and satisfactory treatment in acute inflammatory or congestive glaucoma. However, in some cases it may not be possible or advisable to perform an immediate operation, and in such cases prompt and proper use of miotics will frequently control the attack.

Ordinarily pilocarpin is to be preferred to eserin, since it is less irritating and does not increase the hyperemia of the iris and ciliary body. However, pilocarpin acts by stimulating the peripheral nerves, and should these nerves be paralyzed, which may occur in acute glaucomatous attacks, it will be of no value. In such a case eserin, which acts through the muscles, even though the nerves are paralyzed, should be used. After getting miosis with eserin, pilocarpin may be substituted, or a combination of the two drugs may be used.

Dionin, both as a lymphagogue and for relief of pain, is useful. In addition, hot moist packs may be applied to the affected eye, and if necessary morphin and chloral administered internally to secure rest. Another very useful remedy in any form of glaucoma associated with pain is large doses of sodium salicylate. In syphilitic subjects, prompt reduction in intraocular tension often follows the intravenous use of salvarsan.

When miosis and sufficient reduction in tension are not secured by extraocular and medical treatment, operation must be resorted to.

Of all the operative procedures that have been recommended for acute glaucoma, iridectomy stands today the most generally approved. It should be performed early, while the excretory apparatus is still intact and before the angle of the anterior chamber is obliterated. If the tension is very high, and has not been partially reduced by the medical treatment, posterior sclerotomy may be done. Guist, of Vienna, prefers a slow preliminary puncture of the anterior chamber, letting out one or two minims of aqueous. In plethoric individuals, with high blood pressure, some form of blood letting is recommended by Meller of Vienna; not with the expectation of reducing intraocular tension, but as a precaution against choroidal hemorrhage following the iridectomy.

The unoperated eye should be kept under the influence of a miotic, in an attempt to prevent in it the onset of an acute attack of glaucoma following the operation on the affected eye.

In chronic inflammatory, sometimes called subacute, glaucoma, all the remedies mentioned in the treatment of acute glaucoma are useful, and should be continued until a decision is made as to what kind of operation is to be performed. A fistulizing operation is usually preferred to iridectomy.

In the management of chronic noncongestive glaucoma, it is well to distinguish between cases with and those without demonstrable increase of tension. In the latter class of cases, the changes in vision, paracentral and peripheral fields are similar to, but not always exactly like, those found in more typical glaucoma. Such cases may or may not show the characteristic glaucomatous cupping, but sooner or later the atrophy of the disc is visible with the ophthalmoscope.

This is probably the most hopeless form of glaucoma we have to treat. Some ophthalmologists believe the continued use of miotics to be beneficial. A few recommend operation. Meller of Vienna thinks repeated tono-

metric measurements at odd hours during the day and night would very likely reveal increased tension. When he operates in this class of cases he does cyclodialysis. Gradle believes this represents a disease, sui generis, of unknown origin, possibly due to a systemic toxin which attacks the optic nerve. If this be true, it seems there is little we can do to combat it outside of general medical care and the prevention of additional toxic factors.

In regard to the other class, glaucoma simplex with increase of tension, the majority of ophthalmologists agree that an intraocular operation, preferably of the fistulizing type, offers the best hope of preventing or deferring the ultimate disastrous visual results. Others oppose operation and depend entirely upon miotics and medical treatment.

It has been the writer's custom to employ miotics for a reasonable length of time in all cases of established chronic glaucoma, provided proper contraction of the pupil can be maintained, the tension lowered, and the field of vision improved or held in a satisfactory state. He believes with Gifford, de Schweinitz, and others that miotics, properly used, can hold this disease in check for long periods. For continued use, pilocarpin in the strength of two to ten grains to the ounce is preferred, for the reason previously mentioned. Eserin, because of the hyperemia it produces in the ciliary muscle and iris, is very likely to cause posterior synechia if continued over a long period. The writer has seen cases of this kind.

When any degree of paralysis of the ciliary nerves is present, eserin should be used alone or in combination with pilocarpin. Histamin is used in Vienna when pilocarpin and eserin fail to produce the proper affect on the pupil. When peripheral adhesion exist, pilocarpin in proper strength should be used first. According to Guist, it is usually effective in pulling the iris from the adhesions, and it differs from eserin in not causing hyperemia.

In the management of chronic glaucoma it is important and necessary to make frequent records of the intraocular tension, field of vision, and size of the blind spot. Only by this means can we safely follow the progress of the disease and be able properly to advise our patient.

Since it is well known that excitement, anxiety, and worry frequently cause sudden increase of tension in a glaucomatous eye, it behooves us to do all we can to prevent such states of mind in our patients. It is well also to instruct our glaucomatous patient to keep in touch with his family physician or internist, in order that the best general health may be maintained and especially that toxic states may be avoided.

Massage of the eyeball is of distinct advantage and aids the action of miotics. In some cases it will actually produce deepening of the anterior chamber. It is of particular value in the treatment of postoperative cases. It is to be used only in chronic noncongestive glaucoma, not in acute cases. The patient can easily be taught to massage his own eyeball with his fingers.

As illustrating the probable importance of light as preventive of glaucoma, it has been observed in the second eye clinic in Vienna that very few cases of glaucoma come in during the summer months; also that not many come in the fall when the weather is clear; but that as soon as it becomes cloudy, or a rainy season begins, many cases of glaucoma appear. Observation as to the time of day when the attacks came on showed certain cases started at six p.m. one month in late summer, others at five p.m. a few weeks later, others at four and three p.m. as the season advanced and the days became shorter. During the night, when the pupil is normally contracted, attacks of glaucoma rarely occur. Therefore in mild cases of glaucoma in patients who stay in well lighted rooms or work outside, it is often necessary to instil the miotic into the eyes only in the afternoon or eve-

ning and on cloudy and rainy days. Likewise, the action of accommodation contracts the pupil, and thus reading may aid in the prevention and treatment of glaucoma.

Regarding the best operation for chronic simple glaucoma, the majority of ophthalmologists in this country and abroad have decided in favor of the fistulizing type. However, the elder Fuchs even now still advises iridectomy. Up to the year 1908 he had observed relatively few bad results following iridectomy in either acute or chronic cases. For a period he also did a large series of Lagrange operations, but he gave it up because he did not like the appearance of the scar. After 1908 he operated and followed the results of sixty cases by Elliot's trephining. In three years he had only two cases of late infection. But because of this complication, he gave up the trephining and returned to iridectomy. At his last report sixty per cent of his iridectomies had good results after four years, and after ten years thirty per cent were satisfactory.

Adalbert Fuchs thinks iridectomy and the Lagrange operation are undesirable, because of the oblique astigmatism produced. He therefore prefers the Elliot trephining for all cases of chronic simple glaucoma. He believes in early operation when indicated; but does not operate as long as miotics will hold the tension down and prevent loss of the field of vision. As an argument in favor of early operation, he has constructed a diagram covering a period of twelve years. In this he shows cases with vision of 6/6, 6/12, 6/24, and 6/60. The cases with vision 6/6 retained useful vision for twelve years after operation, those with 6/12 retained it for eight years, those with 6/24 for five years, and those with 6/60 held their vision only two years. Meller also does the Elliot trephining mostly.

In reference to peripheral iridotomy (Curran) the writer has had a limited experience, having done this operation on about a dozen eyes in 1921 to 1923. Supplementary operative procedures were necessary in most of these cases. Two of the original cases, however, are still doing well with the use of miotics, better than they did before the peripheral iridotomy was made.

There is one good thing about the iridotomy and it is the fact that it is made very far in the periphery. Undoubtedly this incision in the root of the iris so near the filtration angle is the explanation of any good results that have been reported. The same principle applies to iridectomy. When it is made so far peripherally that it removes or separates the iris from the filtration angle, a satisfactory result is likely to follow. This is what Török, Suker, and Woodruff, among others, aim to do in their iridectomies.

H. Gifford believes that with a well performed operation the ultimate results of trephining and iridotasis or iridencleisis, so far as tension is concerned, are practically the same. He also says that in iridotasis the final reduction of tension is often not accomplished until a secondary subconjunctival puncture of the iris has been performed. The same is true in some cases after iridencleisis. Another important point in favor of this type of operation, over Elliot's trephining or the Lagrange, is that the anterior chamber is restored much more promptly and our period of anxiety greatly shortened. As is widely known, a permanent flat chamber is very likely to result in a cataractous lens. A water tight suture is described by S. R. Gifford in the 1927 transactions of the American Academy of Ophthalmology and Otolaryngology as hastening and rendering more certain the reestablishment of the anterior chamber. Early restoration of the anterior chamber reduces the frequency of choroidal detachment.

The experiences of Harrower[1], Wilder[2], H.Gifford[3], and others in this country with iridotasis and the reports of S. R. Gifford and of Pillat on iridencleisis suggest that this type of fistulizing operation is probably the best we have at present for the treatment of chronic simple glaucoma.

(See report of Pillat's observations in the proceedings of the Deutsche Ophthalmologische Gesellschaft, Klinische Monatsblätter für Augenheilkunde, 1927, June, page 859.)

In eighty successful cases out of ninety-four iridencleisis operations, forty had flat scars, thirty-seven had cushion-shaped scars, and thirteen ectatic scars. In the fourteen unsuccessful cases, ten had flat scars, and four had cushion-shaped scars. As to fistulization, in the eighty good results forty-seven, or fifty-nine percent, did not filter, while thirty-three, or forty-one per cent, did filter. Of the fourteen unsuccessful cases, in only one could fistulization be demonstrated by compression of the eye and scar. In thirteen cases, there was no filtration at all. Pillat reports no late infections.

There is no doubt that iridencleisis is easier to perform and less dangerous than Elliot's trephining, and the results appear equally good, even when compared with those of the specially skilled operator. Certainly late infection is much less frequently encountered after iridencleisis than after trephining.

According to Gifford, the relative freedom from infection is apparently due to the avoidance of thin, avascular blebs such as are seen after the Lagrange and Elliot operations. Since the conjunctival flap is not carried down on the cornea, no place of least resistance is found, such as the thin corneal edge of the flap after trephining.

132½ West Sixth street.

References

[1] Harrower. Arch. of Ophth., 1918, Jan.
[2] Wilder. Trans. Sec. on Ophth., Amer. Med. Assoc., 1923.
[3] Gifford. Trans. Sec. on Ophth., Amer. Med. Assoc., 1924.

In some instances, information concerning the work of others was obtained by personal communication.

SOCIETY PROCEEDINGS

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Annual Congress

The Annual Congress took place at the Royal Society of Medicine, London, and at the Royal Ophthalmic Hospital (Moorfields), April 19 to 21, 1928, the chair being occupied by the President, Mr C. Howard Usher, Aberdeen.

Relationships between animals' eyes and human ophthalmology (President's address)

Mr. C. Howard Usher said that it was worthy of mention that, with the exception of Wardrop's "Diseases of the eye of the horse," published in 1819, there was no original work on diseases of the eyes in animals by a British author. Yet ophthalmic surgery was associated in several ways with the eyes of animals. For teaching the student the eye of the pig was a good deal used. The transplantation of cornea, or substitution of clear cornea from a rabbit's eye for an opaque portion of human cornea, was an example of the direct use of the eyes of animals for human surgical needs. The speaker referred to the studies on the subject of albinism in man which were conducted by Karl Pearson and by Nettleship, with whom the speaker was associated. In this, as opportunities of examining human albinos were very limited, albinotic eyes were examined in the dog, horse, rabbit, guinea pig, mouse, bird, and so on. Only two thirds of those examined were found to have eyes completely devoid of pigment; one a blackbird

whose plumage was all white, the other a greenfinch which had patches of canary yellow on its white plumage. A bird with only pure white feathers might have a red pupil and no ocular pigment, or a red pupil and only a small quantity of ocular pigment. It had seemed strange that some of the birds' eyes should contain pigment in the pecten when there was no pigment in any other mesoblastic structure of the eye, as the speaker had believed that the pecten was wholly derived from mesoderm. But Bernd had found an ectodermal origin, and the major portion of the embryonic pecten on the seventh day was of ectodermal origin, the mesoderm forming a relatively inconspicuous part of it. Miss Mann and others had confirmed the two-fold origin of the pecten.

Mr. Usher then went on to refer to the iris color in winter-white animals, and asked whether there was a seasonal variation in the color of the iris of animals which changed the color of their summer coats to white in winter. A number of observations seemed to show that the iris of the mountain hare had less pigment in winter than in summer, though it was difficult to be certain, as this iris had no constant shade of brown in a number of the animals examined. Other series of animals examined did not show seasonal color changes in the iris.

The study of animals' eyes could also help in the study of human eyes in regard to heredity. Human pedigrees were much more difficult to work out than were the pedigrees of animals; also the control of matings and the difficulty of obtaining post mortem examinations were obstacles on the human side. The work now being carried on in this comparative way was likely to be of much value.

Natural history of retinal neoplasms

Mr. E. Treacher Collins read a paper on this subject: The conclusions at which he had arrived, on the very elaborate data which he laid before the meeting, can be summarized as follows: (1) At Moorfields Ophthalmic Hospital there had been no evidence, during the past fifty-five years, of any increase in the number of cases of retinal glioma. (2) Retinal glioma was limited to the very early years of life, as it arose from cells which became highly specialized and soon lost all the capacity they might have had for reproduction. A further point was that this tissue did not contain "mother cells." (3) Cells in metastatic growths of retinal glioma sometimes underwent increase in size and alteration in shape, due to change in their environment, the chief alteration consisting in an increased blood supply, the blood vessels in the primary growth being only terminal vessels. (4) The uveal tract when invaded by retinal glioma reacted by forming fibrous tissue, contraction of which might cause shrinkage of the growth. When the ciliary body was invaded, the supply of intraocular nutrient fluid was cut off, and the loss of this, with the contraction of the newly-formed fibrous tissue, caused the eyeball to shrink. (5) Retinal gliomata were growths of the neural epiblast, and in their mode of dissemination they resembled carcinomata rather than sarcomata. It was more frequent for them to spread by centrifugal permeation along lymphatic spaces than as emboli in vascular channels. For this reason, secondary growths were more frequent in the vicinity of the eye than in the internal organs. (6) The blood vessels of the retina, its only mesoblastic constituents, might certainly be the seat of origin of capillary angiomata, possibly also of angiosarcomata. It was necessary, however, to collect more evidence concerning primary retinal malignant growths commencing after middle life before this could be regarded as proved.

Lieut.-Col. H. Smith said it had frequently been asserted that malignant disease was not so frequent among vegetarian people in the East as among meat-eating Westerns, but, as one who had had a large experience

in both regions, he could assert that this was untrue. Many of those who made such statements had only had a limited experience in one civil hospital.

Mr. Collins, in reply, said glioma could not be attributed to diet, as two-thirds of the cases started before birth.

Discussion on causes and treatment of iridocyclitis with raised tension

Mr. R. Affleck Greeves took it that the discussion was mainly concerned with raised intraocular tension in the active stages of iridocyclitis. The microscopical examination of eyes excised in a state of glaucoma had in the majority of cases shown evidence of interference with the excretory mechanism of the eye, hence ophthalmologists had become accustomed to think of glaucoma in terms of diminished secretion, rather than as a condition of disturbance in the mechanism of supply of the intraocular fluid. Few would deny that blocking of the excretory angle did, in many varieties of the disease, cause the rise of tension. But glaucoma could exist in association with a normal or an increased depth of the anterior chamber, and in the absence of any opposition or adhesion of the iris root to the corneal periphery.

The speaker held the view that in iridocyclitis the deepening of the anterior chamber depended on osmosis. All inflammatory exudates greatly exceeded normal fluids in colloid constituents and hence also in osmotic power, and, while a highly albuminous exudate was being continually poured out into the anterior part of the globe, a redistribution of water would take place, the colloids in the anterior chamber would take up water and the vitreous body would lose it, and consequently the lens and iris would move back. Recent researches showed that the fluid was a transudate from the capillaries of the ciliary body. Duke-Elder showed that equilibrium between the intraocular fluid and the blood could be maintained normally by the greater osmotic power of the colloids in the blood tending to attract fluid, versus the greater actual capillary pressure tending to drive fluid out, and that the chemical composition of the blood and intraocular fluid respectively agreed with the theory of a transudate.

Glaucoma with iridocyclitis occurred most frequently in the middle-aged and elderly, in many of whom the anterior chamber was shallow, and the anatomical conformation of the eye was that associated with a predisposition to glaucoma. It was of a different class from that of iridocyclitis with raised tension in which the anterior chamber was normal or increased in depth, in that the eye was already predisposed to glaucoma, and an inflammatory process sufficed to induce the condition. It was made worse by the use of mydriatics, but miotics often reduced the tension. Still, mydriatics were not always successful in those with deep or normal anterior chamber. In a few cases he had noticed at first atropin raised the tension while eserin lowered it, but after treatment with a miotic for some days, with a successful lowering of tension, atropin could be used with impunity. Writers showed a considerable difference of opinion on the question of mydriatic versus miotic treatment in these cases. His own general line of treatment was to use a miotic where the anterior chamber was shallow and the appearance of the eye suggested a predisposition to glaucoma. In cases with a deep or normal anterior chamber he instilled homatropin, as it was more easily controlled than atropin. If this was beneficial he continued with atropin treatment. But if tension remained raised, or was increased, he recommended miotics. If a definite improvement followed the latter and tension remained normal for some days, he again used a mydriatic.

Mr. W. H. McMullen said that so great was the variety of manifestations of the disease that no rigid classification of cases was practicable. Three types, however, covered the majority. These were: (1) acute iridocyclitis

with increased tension soon after the onset of inflammation; (2) cases resembling acute or subacute primary glaucoma in which careful examination showed uveal inflammation; (3) cases of chronic iridocyclitis in which increase of tension occurred months, even years after the commencement of obvious inflammation.

The speaker referred to the two schools of teaching concerning the treatment of acute iridocyclitis. One laid stress on the danger of provoking high tension by mydriatics, advising caution with the latter, and arguing that should slight rise of tension occur the mydriatic should be stopped and a miotic substituted. The other school emphasized the great value of mydriatics, which should, in their view, be used boldly, though the surgeon should be prepared to operate if there occurred any considerable rise of tension. Mr. McMullen's leaning was toward the second school. With regard to indications for operation, if there was considerable pain, steaminess of cornea, and finger estimate of tension was plus one or more, operation, in his view, should not be delayed more than twenty-four hours.

Sir Arnold Lawson said he had not had a case in which the use of a miotic gave satisfaction. He felt that the use of atropin for cases of the kind under discussion could not be wrong, and when it did not act as it might seem it ought to, he thought it was usually because the cause of the inflammation was not under control. Often the causal factor was obvious; a positive Wassermann or oral sepsis, though in these days he thought there was a tendency to ascribe to oral sepsis any trouble which happened to exist in the body, and that was a real danger; the toxic seat might equally be in any other part of the body. Paracentesis, though glibly spoken of, was, in his experience, disappointing, especially as it might need to be repeated. He favored anterior sclerectomy with a small iridectomy.

Mr. J. Gray Clegg said that of 146 cases of iridocyclitis, fifty (38 per cent) presented definite raised tension which was not due to exclusio pupillae. The cause was syphilis in six, tubercle in two, sepsis in twelve, while in thirty-five no cause was found. Only when medical means did not restore normal tension to the globe did he operate. If a mydriatic had been employed, he discontinued it for a few days. Often he was able to reduce tension by the use of dionin. He did not persevere with medical measures for longer than a week. Nonoperative means succeeded in 23 of 55 cases, though abnormal tension was liable to recur. Paracentesis when that was called for might have to be repeated on two or three occasions. The ideal was to produce a permanent drainage from the anterior chamber, and he had for some time employed the two mm. sclerocorneal trephine method, taking care to remove the whole of the disc. He was now trying the glaucosan solutions suggested by Hamburger of Berlin. If the claims made for it were substantiated, it would do much to solve the problem.

Mr. T. Harrison Butler said that in the acute, florid cases—the so-called medical cases—the use of eserin was apt to be disastrous. Atropin should be employed, and pushed. As most of the cases occurred in females, it was reasonable to have their genitalia examined: a septic focus was found there in a number of cases.

Mr. A. L. Whitehead agreed with Mr. Butler's remarks as to the frequent site of sepsis in female cases. In a large number of his cases there had been some definite—usually septic—condition of uterus or vagina, though in many cases in both sexes no cause could be found. For local treatment he attached great importance to heat, both dry and moist, which could be conveniently applied by electricity. Leeches to the temple were also valuable. Paracentesis should not be repeated more than twice. Operative procedure in these cases was sometimes disastrous. He had also seen bad effects follow the use of miotics.

Discussion on the diagnosis and treatment of inflammatory affections of the orbit

MR. A. F. MACCALLAN opened with an elaborate paper from the ophthalmic standpoint. He suggested that the following was a convenient classification of the causes of such inflammation: (1) injuries; (2) primary osteomyelitis; (3) acute dacryoadenitis; (4) spread of inflammation from neighboring parts, as in (a) panophthalmitis, (b) cavernous sinus thrombosis, (c) infected wounds or abscesses of face or eyelids, also erysipelas, (d) acute pharyngitis (including scarlet fever, (e) acute periodontitis and maxillary periostitis, (f) infections of the accessory sinuses, (g) tuberculous meningitis; (5) septicemic conditions; (6) syphilis and tubercle; (7) orbital myiasis, aspergillosis, actinomycosis.

These the reader passed separately in review, and he reported a number of apposite cases.

Dealing with treatment, Mr. MacCallan said this resolved itself into the evacuation of pus in the orbit—if present—and a careful search for the prime cause of the inflammation, in which one looked for the cooperation of specialist colleagues, not forgetting teeth, bladder, prostate, and so on.

MR. NORMAN PATTERSON entered at length into the rhinological aspect of the matter. He said that in the majority of cases the inflammatory conditions affecting the orbit were secondary to an infection of the nasal sinuses, and children were especially liable to them. His own view was that only rarely were the antrum and the sphenoidal sinuses responsible for the orbital condition. In every case a thorough examination of nose and accessory cavities should be carried out. A chronic suppuration in nasal sinuses might be complicated by orbital inflammation and abscess. Congestion and tumefaction should specially be looked for in the middle turbinate region. When pus was seen, an attempt should be made to trace it to its site of origin. When gross destruction of the wall between the infected sinus and the orbit had occurred, pressure on the orbital swelling might cause an increased flow into the nose. Orbital inflammation might occur very suddenly soon after the onset of a nasal catarrh, pain being later increased on ocular movement. In inflammation of the frontal sinus there was frequently swelling and tenderness of the tissues covering the anterior wall. The orbital swelling might be exquisitely tender, especially in the region of the inner canthus; it was elastic, might pit on pressure, and occasionally fluctuation was elicited. The abscess might rupture externally, leaving a fistula. Transillumination should be carried out in all cases of orbital inflammation. The antrum on the infected side might be dark, and exploratory puncture might be important in treatment as well as in diagnosis. The treatment was considered under three heads: general, treatment of the nasal condition, treatment of the orbital complication.

DR. P. WATSON-WILLIAMS said the three main points for consideration were: (1) whether an orbital or ocular affection was caused by disease in the nose or accessory sinuses; (2) which sinus or sinuses were to blame; (3) what was the pathological nature of the nasal disease. He considered that an inflammatory swelling in the orbit, with tenderness and resistance on pressure, suggested a nasal origin if associated with displacement of the bulbus, or if eye movements were attended with pain and were restricted.

MR. SOMERVILLE HASTINGS stressed the frequency with which swelling and infection of the orbit took place in consequence of syphilis. Another condition he sometimes saw as a sequel of syphilis was a redness and swelling of the inner canthus and vicinity.

MR. E. D. DAVIS spoke of thirty-three cases of his own in which there had been edema or swelling of the orbital contents and which had been sent to him by ophthalmic surgeons for examination of the nose. In sixteen of these cases there was frontal sinus

suppuration, in seven ethmoidal sinus suppuration, in five orbital tumor, in two optic nerve tumor, and foreign body, suppurating cyst, and metastatic panophthalmitis in one each. Thus twenty-three of the cases arose from nasal sinus suppuration. The treatment of inflammation of the orbit or of an orbital abscess arising from the nose was always urgent, more urgent, indeed, than an acute mastoid condition. He described his usual operative procedures. Römer stated that twenty per cent of the cases of orbital cellulitis were followed by optic atrophy, a complication which was to be expected in a severe or long-lasting case.

MR. HARRISON BUTLER stressed the importance of acute cases, which might die, apart from the calamity of losing their sight. In one case the pus was situated only in Tenon's capsule, and an incision there to liberate the pus resulted in an immediate clearing up of the case.

COL. LISTER referred to a case of inflammatory swelling of the orbit due to a suppurating hydatid cyst, which occurred in India, and he said this cause should be included in any category of possible causes.

DR. G. MACKAY spoke of a commoner form of cyst which might cause orbital inflammation, namely, a dermoid cyst, and related a case of the kind.

MR. A. L. WHITEHEAD referred to the help given in these cases by a good skiagram. He also alluded to a group of cases of orbital cellulitis in children, without much proptosis but with considerable fixation of the globe. A few days' rest and fomentations usually cleared the condition up.

MR. JAMESON EVANS said that there were some cases of cellulitis which followed forceps delivery. He had encountered chemosis of the lower part of the conjunctiva in which there was no infection. It seemed to have followed thrombosis in some of the orbital veins. Nothing could be done for these cases, which eventually, after a long time, settled down.

Among other items were the following: (1) a discussion, introduced by MR. MACCALLAN, and spoken to by a number of members, on a report of a series of one hundred private refraction cases with full vision after correction, indications for calling in other specialists being pointed out; (2) a clinical meeting and discussion at "Moorfields"; a dinner; papers by Mr. M. S. Mayou on the juvenile form of Coats's disease, by Mr. G. Alexander on the immediate removal of congenital cataract, by Mr. F. Williamson-Noble on retinoscopy and the pointolite lamp, by Dr. Houwer on the origin of melanomata of the uvea, by Mr. Chas. Goulden on some unusual types of acquired cataract, and on the illumination of the field of operation in ophthalmic surgery.

The Bowman Lecture was delivered by PROFESSOR ELLIOT SMITH, who took as his subject "The new vision."

The conluding event was a visit to the Lister Institute of Preventive Medicine.

CHICAGO OPHTHALMOLOGICAL SOCIETY

March 19, 1928

ROBERT H. BUCK, president

A case of melanosarcoma

DR. E. R. CROSSLEY showed a patient with melanosarcoma who had been seen by the members of the Society in the fall. She had had one treatment of radium. The eye looked better and there was no irritation from movements of the lids.

Discussion. DR. ROBERT VON DER HEYDT said that he agreed that the condition looked less angry, and there had been no progression. At the time the case was presented last fall some photographs had been made, 1.8 linear magnification, showing the exact details of pigment vascularization. It appears now that the vessels leading up to it, which were formerly enlarged, were no larger than the vessels on the other side.

Blastomycosis of lids

DR. LAZAR presented a male, nineteen years of age, colored, who had come to Cook County Hospital in August, 1927, with the following history: Six months prior to entrance he had noticed a small growth on the under surface of the upper lid about four mm. from the outer canthus, which looked like a stye. This became larger and raised the upper lid. He had had no treatment. On examination there was found a large ulcerative brawny red growth replacing the outer two-thirds of the upper lid, and extending along the lower lid to within about two mm. of the inner canthus. The lesion was raised to about one mm. above the skin surface. Throughout the lesion were scattered small vesicles covered with scab, which when removed revealed thick yellow pus. Physical examination was negative. Laboratory tests were negative except that a smear taken from the pus revealed blastomycetes; and this was confirmed by pathologic section. Treatment consisted of small doses of potassium iodide and a two per cent sodium iodide wash three times daily. On October 12, the lesion had completely broken through the upper lid. The patient left the hospital for about seven weeks and when he returned there were three new lesions, two on the upper and one on the lower lid, each about the size of a small finger nail and of a dirty black color. He was put on large doses of potassium iodide—180 grains a day—and had three x-ray treatments. The lesions had disappeared during the past three weeks. The lids were gone but the conjunctival surface was preserved sufficiently to cover the eyeball when an attempt at closure of the lids was made. The last smear taken failed to reveal the blastomycetes. A plastic operation would be done in the near future.

Retrobulbar neuritis

DR. T. A. ALLEN presented a young woman whom he had first seen on February 9, 1928. She stated that about two years ago she had a "poisoning" of one eye, with reduced vision. After some time an impacted wisdom tooth was removed and the "poison" of the eye disappeared. Twenty days before she came to the office the right eye (the one affected two years ago) felt irritable and the vision became somewhat dim. There had been no pain. Upon examination vision was found to be ability to count fingers at one foot. There was a very large central scotoma and on pressure or movement of the eye there was pain, especially on abduction. The right pupil was somewhat dilated, reacted only slightly to light directly, but normally consensually. The left pupil was smaller than the right and reacted normally. The media were clear. One or two very minute hemorrhages and slight exudate were found on the nasal side of the optic disc. The patient was hospitalized and given a thorough examination. There was a large cyst in the place where a tooth had been removed. The ethmoids were infected, but Dr. Shambaugh felt that this was not the cause of the eye condition and urged that the dental cyst be taken care of first. This was done and an improvement was noted within twenty-four hours. Vision gradually mounted to fingers at ten feet, then to 20/100, 20/50, 20/20—, and 20/20 with slight correction. There was good accommodation. The visual fields were rather interesting. There was a very large central scotoma in the affected eye which on improvement at first changed to a red and green, then gradually cleared until there was no scotoma. There was at present a sense that vision was not so clear as it should be. There was a beginning pallor of the optic disc. It was possible that the ethmoids contributed to the condition and would have to be opened; the dental cyst might also be causing some disability as it was not yet entirely healed.

Luxation of lens into anterior chamber

DR. C. O. SCHNEIDER presented a colored woman twenty-six years of age, with a perfectly clear crystalline lens which had been in the anterior chamber for eleven weeks. History revealed that she had been struck in that eye almost three months before. The eye appeared normal except for a deep anterior chamber, a slightly irregular, dilated pupil, and the golden equatorial reflex of the lens seen by oblique illumination. At times there was a slightly steamy cornea together with a little inflammatory reaction at the limbus, some discomfort or pain, and some elevation of tension indicated by the tonometer. These symptoms were controlled by the use of eserin. Luxation of the lens into the anterior chamber was the most dangerous form of displacement, usually resulting in clouding of the lens and cornea, and glaucoma. It was deemed best to remove the lens. After removal, there was present a central clouding of the cornea, due to pressure and abrasion of the endothelium, and imbibition of aqueous by the stroma. It was possible that this might clear up.

Noncompensable visual defects in industrial ophthalmology

DR. GEORGE R. MCAULIFF gave the findings in five thousand cases treated in the routine practice of industrial ophthalmology. (Paper to be published later in this Journal.)

Discussion. DR. OSCAR CLEFF said that the Committee on Industrial Survey was still functioning. No report had been made because an effort was being made to find out by whom industrial surveys were being done at various plants. It was known that most of them were done by optometrists. The matter should be broadcast by the Chicago Ophthalmological Society among general practitioners, because probably fifty per cent of the general practitioners did not know the difference between an optometrist and an oculist. The subject was important. Not only oculists but the industrial plants would benefit if oculists instead of optometrists were to make these industrial surveys. A report would be presented as soon as something definite was learned.

DR. ROBERT VON DER HEYDT said that at the May meeting Dr. Yerger was going to present a paper concerning examinations in industrial plants. Two cases were cited to show how frequently persons with defective eyesight drove automobiles.

DR. W. A. FISHER was of the opinion that it would take more than one paper to be effective in getting action from the Society. He asked if Dr. McAuliff had made any surveys of malingering. He had found many cases in industrial work.

DR. MICHAEL GOLDENBURG was surprised at the amount of pathology disclosed, even though a complete fundus examination could not be made in every case. It was always a problem to know what constituted useful vision. He recalled two patients—one a man who was a crack shot, not infrequently breaking one hundred per cent of clay pigeons fired at. His vision was R.E. 20/40-2; L.E. 20/30-2. He replied to inquiry as to how he could shoot so well by saying that he just brought the gun up and pulled the trigger. Another case was that of an American League ball player. Vision was R.E. 20/30; L.E. 20/200. He batted around three hundred during his entire career of about ten years and was considered a very good fielder. About two years ago he was examined and vision in the left eye was unimproved by lenses, but in the right eye was better than 20/20. The question as to what would constitute industrial blindness was difficult to answer. Visual fields, light sense, and reaction to a stimulus might play a more important part than reading charts.

DR. MCAULIFF (closing) said that probably everyone had had experience with patients like Dr. Von der Heydt's truck driver. One of the large corporations had made a survey of all its chauffeurs and except for occasional

color blindness they all had pretty good vision. In reply to Dr. Fisher's question as to malingering: In case of a bad injury they were all malingerers. The patient's statement as to vision was never accepted. The true vision was obtained first and then they were asked what they could see. Fifty per cent probably would be a good estimate of malingerers. It would be hard to define the relationship of defective vision to accidents. Theoretically, a man with poor vision would be more prone to accidents, but, as stated before, possibly he became a little more cautious in his work.

Histopathology of eyes after various operations

Dr. Richard C. Gamble demonstrated about twenty sections of human eyes which had been operated upon for some pathological condition and later enucleated. The majority showed very marked changes due both to the primary disease and to the operation with its complications, yet in a surprising number the evidence of inflammation was so slight that one might feel that too much emphasis had been placed upon the clinical symptoms which led to enucleation.

A section of a glaucomatous eye was shown in which an **iridotasis** had been performed by grasping the iris midway between its root and the pupillary border, so that a fold of iris had been drawn through the wound and this fold had been converted into a cyst-like structure under the conjunctiva. This complication could have been avoided had several small nicks been cut in the fold of iris after it had been drawn through the wound. The specimen illustrated the fact that one favorable feature of this technique was that the channel from the interior of the eye to the subconjunctival space was lined completely by the pigmented epithelial cells of the posterior layer of the iris, which was favorable to permanent fistulization. It also showed how the iris below was thinned out and pulled away from the chamber angle, which in this case was partly filled with embryonal tissue, possibly the underlying cause of the glaucoma. Instead of a cupping of the optic nerve there was an edema of the nerve head and also of the near-by retina, with large masses of albuminous material between the two nuclear layers, suggestive of either albuminuric retinitis or hypotension.

In a case of glaucoma in which a sclerocorneal trephining had been done, the lens was displaced into contact with the trephine opening and there was an extensive choroidal hemorrhage with almost complete detachment of the choroid and retina.

In a case in which the lens had been completely extracted there was very little evidence of inflammation in the anterior segment of the eye, yet a pronounced retinal periphlebitis was present, indicating that loss of function after operation might sometimes be due to toxic substances filtering back through the vitreous and temporarily affecting the retina or optic nerve. Such loss might not be permanent.

A very extensive diffuse infiltration of the entire uveal tract with lymphocytes and epithelioid cells was shown; a typical example of sympathetic inflammation following cataract extraction. There was marked iris prolapse and detachment of the ciliary body and retina, but no inflammatory changes in the retina or optic nerve.

A **congenital membranous cataract** was shown, which had been extracted through a keratome incision with a hook. It showed a wrinkled, intact capsule with a few degenerated lens fibers and a cross section of the blood vessel within—evidently a shrunken lens. The patient was a child about four years of age.

Another section of an infant's eye was shown because of its rarity. It had not been operated upon. Clinically a white mass was seen in the pupil and the iris was almost in contact with the cornea and had radiating superficial vessels on it. Also the pupil was very small. A diagnosis of glioma was made and the eye enucleated. The

cornea showed no evidence of ulceration or perforation. The iris was thickened and almost everywhere in contact with the cornea. The pupil was covered partially by fibrovascular tissue. The lens was shrunken, its capsule wrinkled, the lens substance infiltrated with connective tissue. Behind the lens was a small cap of connective tissue and blood vessels to which the ciliary processes were drawn over and attached. The hyaloid artery was present and contained blood. The most probable diagnosis was **persistent posterior fibrovascular sheath of the lens,** although the above findings might have been caused by iridocyclitis.

Discussion. Dr. E. V. L. Brown, discussing the last case, was of the opinion that this was one of the real cases of persistent fibrovascular sheath of the lens. One could see a break in the posterior capsule of the lens and the intervening mass. Two of the other cases reminded him of the Meller theory that the sudden and unexpected loss of vision in some cases of iridocyclitis was due to a retinal periphlebitis extending into the nerve trunk and affecting the papillomacular bundle. In one of Meller's cases every retinal vein had a cell mantle as wide as its lumen from its anterior end to the nerve head.

Dr. Michael Goldenburg: Relative to stretching of the iris in the iridotasis operation, Borthen contended that the benefit derived was due to traction. This was probably true in the noncongestive type, but in the vast majority of cases of the congestive type the subconjunctival drainage was apparently the most important factor. Another slide of glaucoma, wherein the swollen state of the ciliary body closed the region leading to the canal of Schlemm, would seem to bear out the theory presented at a recent meeting on closure of the drainage angle. The slide showing some embryonal tissue in the drainage angle was of interest as bearing on the predisposing anatomic factor in glaucoma.

Dr. W. E. Fisher: Prolapsed iris caused more destruction than slight loss of vitreous. With the capsulotomy operation and with Smith's intracapsular operation he had had a large number of prolapsed irides, but in doing the Barraquer operation this very seldom occurred—hence fewer postoperative complications and better visual results.

Dr. Gamble (closing) reviewed several points brought out in the discussion.

Clarence Loeb,
Corresponding Secretary

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

March 19, 1928

Dr. J. Leslie Bryan, Chairman

Intraocular foreign body

Dr. Robert Warner presented the case of C.M.P, white male, mechanic, aged twenty-four years. On February 7, 1928, while hammering on a piece of steel, he was struck in the left eye. He had slight pain and a small hemorrhage from the inner corner of the eye. On the tenth day following the accident examination showed the right eye to be normal. With the left the vision was hand movements at six feet. There was marked iridocyclitis and intraocular hemorrhage. Tension was normal to fingers. Fundus could not be seen due to the hemorrhage.

A diagnosis of intraocular foreign body was made. After x-ray localization a foreign body was removed through a scleral puncture with the magnet. On March 8, the vision was 20/20, with normal field of vision slightly contracted due to the retinal hemorrhage. No double vision was present. The patient was shown.

Discussion. Dr. W. G. Kennon thought the patient had a detached retina. It seemed to him that there might be a hemorrhage between the retina and choroid. He doubted if the detachment would reunite, as he had never seen a cured retinal detachment.

DR. FRED HASTY remarked that late detachments after injury were not rare and that this fact should be borne in mind from the point of view of compensation.

DR. WARNER (closing) said that he had advised final settlement after one year.

Dislocated cataract

DR. R. J. WARNER presented the case of Mr. V. B., aged about fifty years, white male. When first seen about 1921 there was beginning opacity of the right lens. In July, 1926, he had an acute iritis of the right eye which was relieved with atropin. No cause was found. On January 6, 1928, the patient said that previously he could see only light with the right eye, but now he could see his fingers at arm's length. He thought that the cataract was absorbing. Vision of the left eye had been getting worse for three years.

General physical examination by Dr. O. N. Bryan negative. Examination of eyes on January 6, 1928, was as follows: Right eye, external examination negative. Vision equalled fingers at four feet. The lens was dislocated downward. With dilated pupil the fundus appeared negative. The lens was opaque. With slit lamp no vitreous was seen in the anterior chamber. Left eye, external examination negative. Vision 20/200. Lens partly opaque.

On February 21, under butyn anesthesia, a good corneal incision with flap of conjunctiva was made, followed by iridectomy. Capsule forceps were introduced and an attempt was made to get hold of the lens, but the lens receded before the instrument. An intracapsular extraction was then tried, with success. No vitreous was lost. The patient made an uneventful recovery. On March 16, vision with plus 10.00 sphere was 20/20. With plus 3.00 sphere added for reading, newspaper print could be made out at sixteen inches.

Discussion. DR. FRED HASTY spoke of a case in which he had removed a dislocated lens by placing a loop behind it, and much vitreous was lost but a good result was obtained.

DR. M. M. CULLOM told of the successful removal of a lens which had been dislocated for forty years.

Acute lymphatic leukemia with paralysis of accommodation

DR. ROBERT WARNER presented the case of D.L.B., white male, aged twenty-three years, law student. He was first seen February 14, 1928, at which time he said that for the past two days he had not been able to see to read with his right eye. He had had no headache or other eye symptoms. Vision with either eye was 20/20. External examination was negative and through the undilated pupils the fundus appeared normal. The near point of accommodation of the right eye was twenty-four inches; left, eight inches. Two degrees of exophoria and convergence of eighteen degree prism at twenty feet were found. Three days later refraction with homatropine was as follows: With either eye a plus 0.75 sph. with plus 0.50 cyl. axis 90° gave 20/15. The fundi were negative. Four days later the patient returned for a postcycloplegic test, at which time both pupils were widely dilated and did not react to light. He stated that he could not see to read with either eye, but that his distant vision was good. The fundi were again negative.

Blood and spinal Wassermann were negative. Cell count was 0; globulin tests negative. In making the blood Wassermann it was noted that there was a small amount of blood clot in the tube, and a hemoglobin test was made, and showed thirty per cent. A complete blood test then made was as follows: R.b.c., 1,900,000; W.b.c., 32,000. Differential, Poly. 8, small lymph. 40, large lymph. 52. Stained smear showed no nucleated red cells. Many of the lymphocytes were of the type described by Reeder, with the nucleus very poorly stained.

A diagnosis of acute lymphatic leukemia was then made. Eye examination on February 29, fifteen days after

first seeing the patient, showed the pupils widely dilated, no reaction to light, and numerous flameshaped hemorrhages of both fundi. The retinæ were lighter than normal, the optic nerves normal. Vision O.U. was 20/15.

The patient had formerly been a track man in school, but now his wind gave out easily. For two weeks he had had a sore on the shaft of the penis and priapism had been present. He had a severe nasal hemorrhage on February 28.

Discussion. Dr. W. G. Kennon said that lymphatic leukemia was practically malignancy of the blood stream, and he thought that this man had developed small tumors all over his brain.

Dr. Warner, replying to a question, said that no other muscles had shown paralysis.

Herschel Ezell,
Secretary.

PUGET SOUND ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

March 20, 1928

E. C. Wheeler, *president*

Proliferating retinitis

Dr. Harold L. Goos presented the case of J.A.P., male aged twenty-six years, a bookkeeper, first seen in November, 1927. Since July, 1927, he had been going to different doctors for blurring in the left eye. The extraocular examination was essentially negative, but both eyes showed large floating vitreous opacities with a proliferating retinitis and new-formed blood vessels. In both eyes there were several areas of recent hemorrhage throughout the vitreous. Abscessed teeth and infected tonsils were removed. Tests were negative for tuberculosis. Immediate treatment was sweats and catharsis. He had had no hemorrhage since removal of foci.

Vernal conjunctivitis, two cases

Dr. H. A. Schoffman presented two boys, not related, both eleven years of age, born and raised in Seattle. The pathological manifestation in one was of the conjunctiva of the upper lids, in the other of the limbus only. One had had the disease for seven years, the other for five years. History and physical examination were negative. Cutaneous tests for protein sensitivity were negative, no foci of infection were determinable. In the summer of 1927 both patients had radium treatments consisting of fifty milligrams in a one millimeter brass capsule, rubber covered, and held a half-inch from the anterior surface of the eyeball, one hour treatment each week for five weeks. This made a total of two hundred and fifty milligram hours of gamma radium rays to each eye at a distance of a half-inch, within one month. As the use of radium on the eyeball was quite new and was accompanied by danger, the dose and quality of the rays used was decided upon after careful consideration of the recent literature of experimental work in this line, and the eyes were carefully watched during the treatment. The treatments were given by Dr. H. B. Thompson. At the time of report the manifestations were returning.

Discussion. Dr. Goos was of the opinion that the amount of radium used and the length of time of its use, as described by Dr. Schoffman, was too small to be of benefit. He had seen several cases in the South apparently cured with much larger doses and longer exposures, using plaques beneath the lids.

Dr. McCoy had seen benefit follow excising the papules and touching the base with stick silver nitrate.

Glaucoma in a case of acromegaly

Dr. W. G. Cameron presented J.L.H., a switchman, aged fifty-five years, because he had a typical case of acromegaly, as well as a chronic simple glaucoma.

Skin graft in eye socket

Dr. L. L. McCoy showed C.D., aged nineteen years, a state industrial patient

seen July 31, 1926, with a very severe lime burn of the left eye, which had led to symblepharon and generalized corneal leucoma, complicated after three or four months by glaucoma which made enucleation necessary. The socket was so contracted that wearing a prothesis was impossible. On May 3, 1927, restoration of the orbit by means of the Wheeler operation was done, and a very satisfactory result followed. During the past few months mucous secretion had been increasing until at the time of report it was very profuse and annoying.

Discussion. Dr. Davies thought the cause of the profuse discharge from the eye socket following skin grafting was too thick a graft, and advised removing the graft and replacing with one cut very thin, containing only the superficial layers and avoiding sebaceous and sweat glands.

Dr. Cameron was of the opinion that the discharge was being secreted from the remaining inflamed mucous membrane and that attention should be directed to relieving this inflammation.

Keratoconus

Dr. McCoy showed Miss S.S., aged thirty-seven years, who was first seen November 12, 1927. She had a marked keratoconus, the left eye worse than the right. The vision of the right eye was 20/200; of the left practically nil. Glasses improved the right vision to 20/30 but did not improve the left. The interior of each globe was practically normal.

Persistent hyaloid artery

Dr. McCoy presented M.H., a school girl aged twelve years, who had the complete remains of a hyaloid artery, extending from the posterior surface of the left lens to the center of the disc. There was a slight point on the posterior surface of the right lens, also the remains of a hyaloid artery. Vision in the right eye was normal, in the left 20/40 with glasses. The eyes were otherwise normal.

Congenital nuclear cataracts

Dr. McCoy presented D.B., a school girl who had small congenital nuclear cataracts. When the pupils were contracted vision was much reduced, but when the pupils were semidilated the vision was fair. Her eyes were otherwise normal.

A. E. Hillis,
Secretary.

American Journal of Ophthalmology

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

EDITORIAL STAFF

WILLIAM H. CRISP, Editor
530 Metropolitan Bldg., Denver
EDWARD JACKSON, Consulting Editor
217 Imperial Bldg., Denver
CLARENCE LOEB, Associate Editor
25 E. Washington St., Chicago
LAWRENCE T. POST, Associate Editor
520 Metropolitan Bldg., St. Louis
M. URIBE-TRONCOSO,
515 West End Ave., New York City
MEYER WIENER,
Carleton Bldg., St. Louis
HARRY V. WÜRDEMANN,
320 Stimson Bldg., Seattle

Address **original papers,** other scientific communications including correspondence, also **books for review** and **exchange copies of medical journals** to the **Editor, 530 Metropolitan Building, Denver.**

Reports of **society proceedings** should be sent to **Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis.**

Subscriptions, applications for single copies, and communications with reference to **advertising** should be addressed to the **manager of subscriptions and advertising, Jean Matteson, Room 1209, 7 West Madison Street, Chicago.** Copy of advertisements must be sent to the manager by the fifteenth of the month preceding its appearance.

Authors' proofs should be corrected and returned within forty-eight hours **to the editor.** Twenty-five **reprints** of each article will be supplied to the author without charge. Additional reprints may be obtained from the printer, the George Banta Publishing Company, 450-458 Ahnaip Street, Menasha, Wisconsin, if ordered at the time proofs are returned. But **reprints to contain colored plates must be ordered when the article is accepted.**

OPHTHALMOLOGY A BRANCH OF MEDICINE

"I teach ophthalmology in two lectures", said a professor of surgery seventy years ago, when a young man came back from two years spent in Europe for ophthalmic study under Arlt, Graefe, Bowman, Donders, and Desmarres. The young man applied for the position of attending surgeon to the eye hospital of his city. But the positions were filled, mostly by general surgeons, who were interested in operations for cataract and squint and enucleation of the eyeball. It was hard for this young man, who would be a specialist, to get the opportunity he wanted. Specialties in medicine were not then recognized. When specialization was admitted to be proper in medical practice, ophthalmology was ranked as a "surgical specialty". Recently, when the administration of a medical school had to be simplified, an easy way was to class ophthalmology as a subdepartment of surgery.

Calling it a surgical specialty has rather encouraged a bad tendency to emphasize the importance of operations; a tendency against which some of the greatest general surgeons have found it desirable to protest, by the distinction embodied in the contemptuous phrase "an operator, not a surgeon". It is common for medical students to be dazzled by the glory that seems to attach to surgical operations, and to form the ambition to become surgeons, before they know anything about the practice of the profession they have chosen.

The English schools had established a distinction between medicine and surgery before anything like modern ophthalmology had been conceived. In the last fifty years some of their best leaders have expressed great regret that two separate professions had so been recognized. One of the notable achievements of the profession in Great Britain in the last century was the reunion of medicine and surgery as one profession, by the Conjoint Board ex-

aminations, supported by the Colleges of Physicians and Surgeons.

In America legal status was attained as one profession of medicine and surgery. The desire to avoid the separation which had been harmful in Europe has stood in the way of proper recognition of medical specialties. Surgery was recognized as a special branch of medicine; but before the law the physician must show precisely the same fundamental qualifications for the practice of either medicine or surgery. Such qualifications are presupposed by the American Board for Ophthalmic Examinations, now chosen to examine the fitness of the holders of the medical degree to enter on special practice.

It would be unwise to attempt the division of our common profession, now broadly called the medical profession, along the old lines that used to divide surgery from medicine. The professional wig, the gold-headed cane, and the university degree that formerly distinguished the physician from the "barber surgeon" belong to the past. To divide the modern specialties along the old lines, into medical and surgical, would only be progress "if like the crab we could walk backward".

In these days there is another reason to emphasize that ophthalmology is a part of medicine as regards the use of that word to mean, not only the giving of drugs, but the entire healing art. The attempt to raise the old and honorable art of making and fitting lenses into a pseudoprofession of optometry, by legislation, dictionary definitions, and newspaper advertising, also seizes every opportunity to coin and spread suggestive phrases which will carry the propaganda of the optometrist. "If you want your eye operated on go to an eye surgeon: if you want to prevent cataract go to an optometrist." These are used to keep up the confusion attached in the popular mind to certain words that resemble each other, as optician, oculist, ophthalmologist, optometrist. In the propaganda of the would-be new profession all are classed as "eye specialists". The essential thing to teach the public is that the eye is a part of the human body, and should be treated only by those who, having received a regular medical education, have studied the body and its diseases as a whole. Because of the scholastic custom of the past, this idea is suggested better by the term "eye physician" than by "eye surgeon".

Even within the medical profession, the claim that the eye can be studied, treated, and corrected by those ignorant of anatomy, physiology, or pathology is often allowed to go unchallenged by physicians who are nevertheless indignant at the effrontery with which the osteopath or chiropractor claims that he can make adjustments of the bones or nerves without any fundamental training in medicine. Some medical practitioners are so uninformed regarding the effects and implications of refractive errors that they refer patients who might have eyestrain to an optometrist, or even go to him for their own glasses.

From the scientific standpoint and also from the side of public interest, there is a special reason to insist that ophthalmology is a part of medicine. The problems of causation and prevention of cataract and glaucoma are not to be solved by any improvement of surgical technique. Even the success of an operation may depend upon the powers of tissue recovery. The unsolved puzzles of ophthalmology are questions of medical science. That they should be approached with the best possible training in fundamental medical science needs to be emphasized in every way. The notion that they can be mastered by anyone who is ignorant of medical science, or has lost interest in its broader aspects, needs to be corrected wherever found.

The trend of modern medicine toward prevention of pathologic changes is illustrated today by the growing emphasis on "health examinations". The eye is peculiarly fitted for the minute inspection of its living tissues, and furnishes a wide variety of tissues open to such inspection. Ophthalmoscopic and biomicroscopic examina-

tions give command of anatomic details and histopathology. Our tests of visual function are very exact and significant. The examination for glasses is really a finely developed health examination, which of necessity brings out facts regarding the health of the general circulation and the general nervous system. The progressive ophthalmologist must be interested in the widest and newest advances in medicine, and he can bring them into public service. Only by understanding the broad medical relations of ophthalmology can such examinations be made adequate, scientific, or honest.

E. J.

LOCAL BENEFITS FROM GENERAL PHOTOTHERAPY

Much has been said about the benefits to be obtained from local use of ultraviolet radiation in certain diseases of the eye, especially tuberculous affections, sluggish types of iridocyclitis, and phlyctenular keratoconjunctivitis. More recently a number of writers have emphasized the belief that greater benefit may be expected from general light therapy than from local applications.

Early in 1922, with a view to placing on an orderly basis the knowledge and application of this line of treatment, the Medical Research Council of Great Britain appointed a committee on the biological action of light, and in 1925 an ultraviolet clinic was organized at the Royal London Ophthalmic Hospital. The results obtained were sufficiently successful to lead to the clinic being placed on a permanent footing as a detail of ophthalmologic practice at Moorfields.

Duke-Elder now presents a comprehensive report on four hundred and twenty-five cases treated in that institution, his first paper dealing with general phototherapy, in which the patient is subjected to artificial sun baths. (British Journal of Ophthalmology, June, 1928.)

The complex influence of ultraviolet light upon the patient, still incompletely understood, includes photoreactions involving the proteins and sterols in or near the surface layers of the skin, and a photoelectric effect which recent study has shown to be much greater than was anticipated.

The most obvious clinical effect of radiation is the production of an erythema, which may vary, according to dosage, from extremely slight reddening of the skin, not followed by exfoliation, but associated with transient subjective symptoms, to a deep and intense erythema, with edema and the formation of blisters, and the disagreeable local sensations and systemic upset which are experienced after severe sunburn.

The most important and definite further effect of radiation is an increase in the bactericidal power of the blood. It has been found that blood from a suitably radiated subject, after inoculation with staphylococci in the test tube, remained sterile, while blood from unradiated controls grew colonies profusely.

Among numerous other changes which have been recorded, fairly intense doses of radiation also produce a slight erythrocytosis, an increase in hemoglobin, an increase in platelets, a decrease in polymorphonuclear cells, an increase in lymphocytes, and a marked increase in eosinophiles.

It has proved impracticable to standardize the dose of ultraviolet radiation in any other way than by clinical observation of its local and general effect upon the individual patient. As with tuberculin, each dose must be planned according to the reaction produced by the preceding one. The parts of the body normally covered with clothing are more sensitive than the face and hands.

The best effect is obtained from such a dosage as produces a mild erythema, followed by fine desquamation, over about one-fourth of the body surface. The initial dose may be estimated by exposing four small areas for intervals of from two to eight minutes. The amount of ultraviolet energy received varies with intensity of lamp, distance,

and time, it being important to remember that the effect of radiant energy is inversely as the square of the distance. A convenient method is to expose three successive areas of the body each week.

The general tonic effect of correct radiation is usually very marked. Mentally, the patient is said to experience "the feeling of well-being and many of the exhilarating effects of a holiday in a sunny climate".

The most important danger of the treatment is overdosage, the symptoms of which include general lassitude, headache, nausea, sleeplessness, and loss of weight (a very useful criterion). Some people have an idiosyncrasy to light, and in them the dose must be maintained at an especially moderate level.

Duke-Elder and his co-workers have found the method to be of considerable value as an adjunct to the ordinary routine therapeutic measures. In tuberculous diseases and in phlyctenular disturbances it is described as the treatment of choice. Its greatest field is in chronic infections which have appeared to resist all other forms of treatment.

Duke-Elder concludes by quoting with approval an Italian proverb which says: "To bathe in water is good, in air better, but in sunlight best of all". Modern civilization may still be paying insufficient attention to the fundamental principle of physical life here expressed. *W. H. C.*

VISUAL ACUITY TESTS AND RECORDS

The dependence of science on exact observation is illustrated in the history of tests for visual acuity. Robert Hooke, professor of geometry and "experimental philosopher", called attention to the "minimum separabile" in 1671, when he reported his own observations to the Royal Society of London, and demonstrated to his fellow members that the limit of their visual acuity was the angle of one minute or a little less. This was almost one hundred and ninety years before Donders suggested to Dyer and Snellen that the one-minute angle should be made the basis for the construction of test letters. In 1862 Snellen published his first "optotypes", using twenty block letters, each constructed to subtend an angle of five minutes at the maximum distance at which it was supposed to be visible to an eye having good sight.

Since that time the "Snellen letters", either in the original form or as modified, have been the general test for visual acuity. Modifications have been very numerous. Giraud-Teulon used letters subtending a three-minute angle horizontally and five-minute vertically, making the spaces of black and white about equal in area. Green reduced the number of letters employed to ten, and adopted Gothic instead of block type. Oliver reduced them to seven. In 1868 Snellen used an incomplete square, omitting one or two of its sides, but retaining the five-minute angle. In 1875 he modified it, introducing the shorter line in the middle, making what is often called the "Snellen E". In 1887 Landolt suggested the "broken ring", a one-minute break in a five-minute ring; and in 1890 the writer proposed the incomplete square, each side subtending an angle of three minutes.

The latest, and in some respects the best, modification of test letters has been suggested by Cowan (see p. 625). But whether the theoretic physiologic basis is the best practical basis for tests of visual acuity may still be doubted. The difference in legibility of different letters, the illumination of the test card, the color and shade of the background, irradiation at the junction of light and dark surfaces, and the state of retinal adaptation, must all be considered or eliminated, before an ideal record of visual acuity can be obtained. The testing and recording of visual acuity is a different thing from trying the comparative effects of different lenses for the subjective correction of ametropia. It is a mistake to use the same method and the same test card for both purposes.

In every group of test letters that has been proposed, some letters are easier to see, can be recognized farther away than others. This is a great advantage while trying which lens before the eye will give the better vision. With a line in which all the letters are of the same size, it is yet possible to try several lenses before the eye; and to know that one of them is better than any of the others, because it makes all the letters recognizable, while other lenses only show part of them. Even among the nine letters chosen by Cowan, some can be recognized one-fifth farther away than others. If the former were taken as indicating standard vision, 20/20, the latter would indicate vision of 16/20. With many of the test cards in use, if recognizing a certain letter means V. = 20/20, recognition of another on the same line may mean V. = 10/20. One may test this for himself by placing the card too far away to recognize any letter on the line; then gradually approaching it, and noting the distance at which each letter becomes visible.

Not until the unfitness of letters for testing visual acuity is understood shall we have records that are scientifically accurate or practically satisfactory. The test letters should still be used for subjective testing of refraction; but the records of vision should rest on a more constant, exact, and scientific basis. Some figure like the broken ring or the incomplete square, that is always the same, must be used as the standard; and lines of test letters will be useful and reliable when they are marked by careful comparison with the standard test. The seeing of such a standard test will be influenced by the astigmatism of the eye, affecting its visibility when turned in different directions. But this can be very quickly recognized by repetitions of the test, and thus be used to advantage.

The practical use of the international test, of the incomplete square, or of the "Snellen E" must be wholly different from the ordinary test with letters. The test is to be used by turning it in different directions. The simplest, most effective way is to have a single figure printed on the center of a square or circular card. The distance is to be varied by bringing the card nearer to the patient, or the patient nearer to the test; and from a scale on the wall, or from marks on the floor, one records the distance at which the direction of the arms or of the break is certainly recognized. The test can be repeated any number of times at a sitting, and the exact acuity known with certainty irrespective of the age, intelligence, or language of the patient. Test letters standardized by comparison with this test may also be used as equivalent. Records derived from such tests will have a scientific exactness and a permanent value not possessed by records obtained with the necessarily variable test letters. *E. J.*

OBITUARIES

Félix Lagrange

(Summarized from an obituary by Professor M. Teulières in the Archives d'Ophtalmologie.)

Félix Lagrange, originator of the principle of iridosclerectomy for chronic glaucoma, died on April 22, 1928, in Paris. He was born in 1857 in the village of Soumensac (Lot-et-Garonne), not far southeast of Bordeaux. His father was a blacksmith, who made appreciable sacrifices to complete the education which his son so ardently desired.

After promotion in the health service and in the surgical hospitals of Bordeaux, Félix Lagrange was sent by the military administration to French Indo-China, where he founded a hospital. On returning to Bordeaux, after two years, he took up ophthalmology. His early original work in this department dealt with strabismus and errors of refraction. After fifteen years he published a two volume work entitled "Treatise on tumors of the eye, the orbit, and the adnexa". Among the more ambitious of his later literary undertakings were included the "Encyclopédie française d'Ophtalmologie",

which he directed in collaboration with Valude, and a war atlas of ophthalmoscopy, published at the end of the great war.

He had become especially interested in the baffling problem presented by chronic glaucoma, and on June 8, 1905, he presented to the medical society of Bordeaux a patient suffering from this condition on whom he had done an iridectomy followed by sclerectomy. This was the first communication on the operation now known by his name and which was the forerunner of Elliot's trephining operation.

Felix Lagrange, 1857-1928

Later, by his operation of colmatage (cauterization of the sclera over the ciliary region) he sought to raise the tension of hypotonic eyes, and he devoted a good deal of attention to studying the causation of hypotension.

His great qualities as clinician and teacher were shown as professor of ophthalmology in the Bordeaux faculty. Seven years before his death, he lost the wife who had collaborated in all his writings, for which she made the bibliographies and many drawings. He always preserved a great affection for the dignity of military life, and, as his end approached, after calling in his children one by one, he asked to be buried without pomp and with none but military honors. He desired "that the bell which had rung for his baptism should ring for his burial". Of his own selection, also, is the motto on his tombstone:

Speravit anima mea.

Myles Standish

Dr. W. Holbrook Lowell writes:

"I am sorry to have to report the death of Dr. Myles Standish, on June 26, 1928, at seventy-six years of age.

"Dr. Standish was born in Boston on October 17, 1851. He was the son of Francis and Caroline Amanda (Rogers) Standish. He was educated at Bowdoin College, where he took his A.B. in 1875 and his A.M. in 1878. He graduated from the Harvard Medical School in 1879. He also had an honorary S.D. from Bowdoin College in 1910. He was a member of the Delta Kappa Epsilon fraternity. On April 28, 1890, he married Louise M. Fanwell; they had four children, Barbara, Lora, Myles, and Alexander.

"His earlier medical career included an interneship at Carney Hospital in 1879-1880, postgraduate work at the University of Berlin in 1880-1881, and a house surgeonship at the Massachusetts Eye and Ear Infirmary, 1881-1883. He had been assistant surgeon in the Massachusetts General Hospital, the Boston City Hospital, and the Carney Hospital, 1892-1913, and assistant surgeon of ophthalmology of the Massachusetts Eye and Ear Infirmary, 1888-1892, while at the same institution he became ophthalmic surgeon, 1892-1913, and consulting surgeon, 1913. At the Harvard Medical School he was assistant in ophthalmology 1892-1901, instructor 1901-1904, assistant profes-

sor of ophthalmology 1904-1909, Williams professor of ophthalmology 1909-1914, and emeritus professor from 1914. He retired as captain on the Ambulance Corps, M.V.M., in 1891; and he had been in the United States Medical Reserve. He was a frequent contributor to medical journals, and was a member of the Massachusetts Medical Society, the American Medical Association, the New England Ophthalmological Society, the American Ophthalmological Society (of which he was president in 1912). He retired from practice some years before his death."

BOOK NOTICES

Biomicroscopie de la chambre antérieure, de l'iris, et du corps ciliaire (Biomicroscopy of the anterior chamber, iris, and ciliary body). Dr. Jacques Mawas, of the Collège de France and Rothschild Foundation. 119 pages, many illustrations in text, and 30 plates outside the text, of which 26 are in colors, containing 59 colored drawings. Masson et Cie, Paris, 1928. (Published under the direction of the Société Française d'Ophtalmologie.)

This is an extremely beautiful scientific production with an ambitious purpose. It is the second part of a complete treatise on microscopy of the living eye, the publication of which has been undertaken by the Société Française d'Ophtalmologie, and of which part one was published in 1926, being written by Professor E. Gallemaerts of Brussels, under the title "Microscopic examination of corneal affections by means of the slit-lamp".

The physical structure of the present work can fairly be described as magnificent, the numerous text illustrations being brilliantly augmented by thirty plates, of which twenty-six, including fifty-nine illustrations, are in colors, while twenty-three of these colored plates, including fifty-five illustrations, are from remarkably clever drawings, perfectly reproduced, of normal and pathological conditions as actually seen with the corneal microscope.

Chapter one is an interesting historical review of the development of microscopy of the living eye, more particularly since Gullstrand's demonstration of his first model of the Nernst slit-lamp before the Heidelberg congress in 1911. It was not until two or three years after this date that Henker thought of using simultaneously the Czapski binocular microscope and the slit-lamp. But it must not be forgotten that several earlier workers, including ophthalmologists and histologists, had entertained the idea of studying the living eye beneath the microscope, using lateral illumination; an ocular microscope having been constructed as early as 1863 by De Wecker (with a magnification of forty to sixty diameters), and the celebrated English physiologist Waller having published in 1865 an important memoir on the microscopic examination of the living eye of the albino brown rat ("surmulot").

Mawas does not hesitate to say that microscopy of the living eye is as important to know as ophthalmoscopy and optometry. He dismisses as no longer deserving of consideration the opinion of those, "and they are still unfortunately numerous", who argue that biomicroscopy has no practical importance, and he compares this attitude with that of early critics of ophthalmoscopy.

The author criticizes most previous treatises on ocular microscopy as being descriptive works, accompanied by fine illustrations, but without sufficient attempt to relate the subject to physiology, physiochemistry, or even histology and embryology. "In a word, biomicroscopy is still in the purely anatomic descriptive phase." The author therefore devotes a good part of his hundred or so pages of text to a review of these obviously important related fields of scientific study. Much of the histologic, embryologic, and pathologic material thus given is such as may be found in previous works on

ocular histology, embryology, and pathology.

After this declaration, and taking the volume as a whole, it may be doubted whether the author has succeeded in establishing so intimate a relationship as one might have hoped between the details to be seen by biomicroscopy and the facts acquired in other lines of study.

But any shortcomings of the volume may be overlooked in the light of its obvious excellencies. Among the more remarkable, scientifically and artistically, of its very remarkable series of colored drawings may be mentioned the following: hemorrhage into the vitreous, anterior chamber, and pupil; sector atrophy of the iris; encysted foreign body on the iris; probably tuberculous nodule on the pupillary margin; chronic iritis complicated by cataract; iris lesions in complicated cataract; lesions of the pigment epithelium of the iris; iris changes in Hippel's disease; iris cyst; nevoepithelioma of the ciliary body invading the iris and sclera, with secondary cataract; sarcoma of the iris. *W. H. C.*

National Society for the Prevention of Blindness, proceedings of the 1927 annual conference. Paper, octavo, 202 pages. New York City, published by the Society, 1928.

This Society, formerly known as "Committee", has a record for excellent work in the field of service that its name indicates. Much of its effective influence has been exerted through its annual conferences held in connection with other national organizations. The 1927 meeting, held in Chicago last October, was in association with the Illinois Social Hygiene League, National Safety Council, Illuminating Engineering Society of America, Chicago Ophthalmological Society, and state and provincial health authorities of North America. These Proceedings are divided into seven sections, each giving the papers and discussions relating to a particular part of the field for the prevention of blindness.

The sections are: (1) Relation of venereal diseases to visual impairment, with papers by Drs. John Green of St. Louis, William L. Benedict of Rochester, Minn., and Edward L. Cornell of Chicago, and discussion by ten physicians and others; (2) Eye accidents in industry, five papers, each discussed by from two to ten speakers; (3) Relation of proper lighting to conservation of vision (only one of these papers is published here, the others being available from the Illuminating Society of America); (4) Necessity of correcting eye defects in school children, two papers by Drs. William H. Wilder of Chicago and Walter S. Cornell of Philadelphia, discussed by ten ophthalmologists; (5) Prevention of blindness from the standpoint of the ophthalmologist, a paper was published in full in this Journal, v. 11, p. 28; (6) Sight-saving classes, their rôle in conservation of vision—medical and pedagogical administration, no papers included in this section, but the proceedings of its luncheon conference, presided over by Dr. E. V. L. Brown of Chicago, being published as no. 17 of the Sight-saving Class Exchange, and obtainable from the National Society on request; (7) Trachoma as a public health problem, five papers by physicians who have been engaged in public health work, with the discussions they elicited.

The work of this Society should command the active cooperation of all physicians engaged in ophthalmic practice. The dollar for which the volume of proceedings can be obtained from its office at 370 Seventh Ave., New York City, will give contact with the Society's work, as well as contribute to the cause in which we are most actively interested. *E. J.*

The stereoscope in ophthalmology, with special reference to the treatment of heterophoria and heterotropia (designed to accompany the phoro-optometer stereoscope and the Wells selection of stereoscopic charts). David W. Wells, M.D., F.A.C.S., emeritus professor of

ophthalmology, Boston University Medical School, etc. Revised edition, 107 pages, numerous illustrations. Boston, E. F. Mahady Company, 1928.

The reprinted preface of the first edition of this little work states the author's position as conservatively midway between those who have made exorbitant claims for muscle treatments and those who completely ignore muscular imbalance. As to squint, the author rightly emphasizes the frequency with which cases of strabismus are brought to the ophthalmologist too late to be satisfactorily remedied. In his personal experience, of all private cases of esotropia seen from 1913 to 1918 only twenty-five per cent were less than six years old.

The greater part of the present essay is devoted to hyperphoria, and the treatment advocated is chiefly stereoscopic fusion training. Much of the information given in the earlier part of the work is of decidedly elementary character. The very common confusion between the terms "degree" and "prism diopter" is made a matter of protest. In the full discussion of stereoscopic training, free use is made of the work of other writers, and a practical description of the apparatus of others, sometimes as modified by the writer, is included. The Maddox rod is dismissed with the statement that it "is a very accurate test." Statements quoted in the volume as of full authority may at times be open to difference of opinion; for example, the dogma of Worth that "the full development of the fusion faculty is not attained until the fifth or sixth year with the normal child."

The author states that to carry out his methods of stereoscopic training one must have a phoro-optometer, with two rotary prisms and the stereoscopic attachments. Hence a good deal of attention is naturally devoted to this apparatus. The patient's treatments should be personally conducted by the physician. "In the average case ten to twelve treatments suffice to put the patient on an independent basis; that is, he . . . . knows how to send the required neuricity to the internal recti."

The difficulty of sifting out the relative responsibility of refractive errors, muscular imbalances, and psychic instability in the production of asthenopic symptoms is demonstrated by the illustrative case reported on pages eighty-seven to ninety-one. The patient, a woman of admittedly neurotic tendency, had evidently been previously given a decidedly inadequate astigmatic correction, and she had been subjected to two muscle operations and to the wearing of a combination of prisms. What share of her later improvement was due to a fuller astigmatic correction and what to her muscle exercises it might be hard to decide. The reviewer is puzzled by the giving of a minus sphere which had not been indicated under cycloplegia (as reported in the text) and also by the giving of unequal cylinders although astigmatism of equal amount had been found for both eyes under cycloplegia. It is to be feared that a very large percentage of all elaborate procedures for muscle training are substitutes, often ineffectual, for accurate refraction.

W. H. C.

The human cerebrospinal fluid. Association for Research in Nervous and Mental Diseases, vol. 4, 1924. Cloth, octavo, 592 pages, 57 tables and 75 illustrations. New York, Paul B. Hoeber Inc., 1927.

This book interests the ophthalmologist from two points of view. The analogies between the aqueous humor and the cerebrospinal fluid are such that the study of the latter may well give important suggestions as to the study of the former. It is also interesting as a record of scientific research carried on and reported on a somewhat original plan.

The officers of the Association for Research in Nervous and Mental Diseases for 1924 were: Walter Timme of New York, president; Llewellys F.

Barker, Baltimore, vice-president; H. A. Riley, secretary-treasurer; J. K. Davis, assistant secretary; and, on the editorial board, Charles L. Dana, Smith Ely Jelliffe, and Frederick Tilney. There were thirty-nine contributors to this volume, representing ten of the leading American universities, many well known hospitals, and other medical institutions. Although at the meeting of 1924 the program was made up of these papers, the volume really represents years of work on the subject before and since. The clinical contributions in this volume were based upon five thousand recorded examinations of human cerebrospinal fluid.

The first section of the book, occupying sixty-six pages, deals with the characteristics of the normal fluid. It gives a presidential address, papers on the embryogenesis of the fluid, and a review of the literature, including a bibliography of 246 references. Section 2, including seven papers, discusses embryological, chemical and physical properties of the fluid, under normal and pathologic conditions. Section 3, on pressure studies of the cerebrospinal fluid, contains five papers. Section 4, on diagnostic replacement of the fluid, gives three papers. Section 5, eight papers, takes up changes in the fluid connected with diseases of the central nervous system. Section 6 has three papers on the reaction of the fluid in extraneural diseases. Section 7, two papers, discusses the treatment of diseases through the cerebrospinal fluid.

There is an appendix giving a summary and estimate of examinations from numerous hospitals, and a list of the 217 members. This and an index of twenty-six double column pages render the volume a very convenient reference book. *E. J.*

Operative Surgery. J. Shelton Horsley. Cloth, 893 pages, 756 original illustrations. The C. V. Mosby Company, St. Louis, 1928.

It seemed for a while that the science of surgery was being subordinated to the art of operations, with the multiplicity of methods advised by typographic efforts broadcast in all types of medical publications. Most of the "new methods" in retrospect seem to have been but modifications of older procedures promulgated in print for the benefit of the respective authors.

The wave of practice has now turned toward simplicity. The froth has bubbled away, the residue has settled, and the strong spirit of science seems now to stimulate the surgeon rather than the novelties of bizarre practice. The third edition of this surgery lays down and adheres to the cardinal principle of the preservation of physiologic function, and interprets the physiologic processes that follow surgical operations. Thus, the author does not give us an encyclopedia of operations. He describes those which he has done or which appear to him to be best suited to the various conditions that may obtain.

This third edition contains much new material in which better tried procedures are substituted for some older methods.

While the work is on general surgery, it will be noted that there is a contrast to the pages and pages of older treatises given over to amputations and destructive radical operations.

Of particular interest to the specialist are the plastic surgical procedures about the face, which eliminate or minimize cicatricial contractions so distressing and obvious. The author does not believe that heterogenous transplantation of tissue is successful; such grafts and glands always being extruded, absorbed, and replaced by cicatricial tissues. Even grafts from another human being do not grow into the tissues of the receptor. He thus relies on autogenous flaps in plastic work. For a full description of this work it would be needful to catalogue the operations, which is unnecessary for this type of review.

Well illustrated and printed, this book is a reliable guide for the general

surgeon and helpful to the specialist, each in his field of endeavor.

H. V. W.

Conserving the sight of school children, a program for public schools. Report of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association. Published by the National Society for the Prevention of Blindness. Second edition, revised, sixty pages, illustrated. Available at cost, National Education Association, 1201 Sixteenth street N.W., Washington, D.C.; American Medical Association, 535 North Dearborn street, Chicago; or National Society for the Prevention of Blindness, 370 Seventh avenue, New York. Single copies, price 35 cents net.

This pamphlet, prepared under the editorship of Dr. Thomas D. Wood, chairman of the joint committee, aims to supply teachers, school officials, and others with information, practical directions for conserving the vision of school children. The present edition includes illustrations of the symbol E chart and a letter chart, the former being used according to the technique for preschool age so happily popularized by Mrs. Royer in her recent tour of the United States. The two pages of illustrations are devoted to this adaptation of the symbol chart as a game with the "funny little animal" whose legs are up, down, right, or left. The new scientifically conceived chapter on lighting the schoolroom is readily understood by nurses and teachers.

This booklet should be consulted by doctors, nurses and teachers engaged in testing the vision of school children and in promoting ocular hygiene.

W. H. C.

Folklore of the teeth. Leo Kanner, M.D. Octavo, 316 pages, 17 illustrations. New York, The Macmillan Company, 1928. Price $4.00.

Although latter years have shown that there may be rather intimate relationships between teeth and eyes, this volume on the folklore of the teeth has little to say concerning the visual organ. However, it contains a good deal which will be of interest to those who concern themselves with the curiosities of medicine, especially as related to the medical point of view of primitive peoples. The volume is easier to dip into than to read consecutively. Yet it is well written, and orderly in arrangement. The frontispiece is a photogravure of the famous painting by Carlo Dolci of Saint Apollonia, known, particularly in Roman Catholic countries, as the patron saint of toothache. Another reproduction is of Flaminio Torre's "Martyrdom of Saint Apollonia"; in which the saint, tied to a broken column, is shown as about to have an extraction performed with a pair of forceps which look more like fire tongs.

Particularly full of quaint information, and very readable, is the chapter on the folklore and cultural history of the toothpick and toothbrush. The author has added to the work a bibliography of fourteen pages, and a glossary.

B. A. F. and *W. H C.*

ABSTRACT DEPARTMENT

Abstracts will be classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases, including parasites
18. Hygiene, sociology, education and history

---

1. GENERAL METHODS OF DIAGNOSIS

Aynsley, T. R. **A lamp for ophthalmic work.** Brit. Jour. Ophth., 1928, v. 12, June, p. 321.

This contribution and the accompaning illustration describe an "Adjusto-lite" and also a Tudor-Thomas screen fitted with a diaphragm which can be placed before any electric light in the home. These lamps are suggested for use in examining patients away from the office.

D. F. Harbridge.

Comberg, W. **Testing corneal hypersensitivity to pressure on the lid as an aid in diagnosis.** Zeit. f. Augenh., 1928, v. 64, Feb., p. 127.

The author palpates the cornea through the closed lid with his finger or a thin glass rod, and so finds the location of recurrent erosions, poorly healing ulcers and old foreign body injuries. The method is most useful in distinguishing simulation from actual pathological changes in that the patient with a real lesion complains of pain only when the hypersensitive area is pressed upon, while the simulant usually reacts severely to pressure over all parts of the cornea.

F. H. Haessler.

Cowan, Alfred. **Test cards for the determination of the visual acuity.** A review. Arch. of Ophth., 1928, v. 57, pp. 283-297.

The multiplicity of test cards used at the present time is pointed out in this paper. The writer refers to many of them and calls attention to the well known defects which none of them entirely avoid. He concludes that taking all factors into consideration a standard test should be agreed upon in order to correct the intolerable situation which now exists. *M. H. Post.*

Gros, H. B. **A new perimeter.** Ann. d'Ocul., 1928, v. 165, April, pp. 255-257.

This is a portable perimeter which can be used in bedside work. It has much the appearance of an inverted umbrella. It is constructed on a combination of the principles of the perimeters of C. B. Walker and P. Gaudissart. *L. T. P.*

Piotrowski, G. **The diagnostic value of biologic reactions in ocular affections.** Rev. Gén. d'Opht., 1927, v. 41, May, p. 13. (bibl. 26 refs.)

The author gives the results of a study of 465 cases of different ocular diseases. In the majority of cases the test was made twice, and in a certain

number of cases several times, to control the effect of treatment. For the Wassermann reaction the technique of Meier was used, and for the fixation reaction in tuberculosis the antigen of Besredka, with the technique of Valtis or of Goldenberg. The findings in the following four classifications are suggestive:

Phlyctenular keratoconjunctivitis: 67 cases examined for Besredka reaction, 30 positive. 72 Wassermann examinations, 3 positive.

Parenchymatous keratitis: 23 cases tested for Besredka reaction, 3 positive. 18 cases for Wassermann, 9 positive.

Iritis and iridocyclitis: 54 cases for Besredka reaction, 11 positive. 92 cases for Wassermann, 26 positive.

Paralysis of extrinsic ocular muscles: 20 cases for Besredka reaction, none positive. 32 cases for Wassermann reaction, 11 positive.

The author concludes that the Wassermann reaction is of undoubted service in affections of the uveal tract and in cases of paralysis, but of secondary importance in other affections. The Besredka reaction may be of service but much more in revealing a systemic infection than to diagnose tuberculosis localized in the eye. A positive reaction does not indicate that the ocular lesion is of tuberculous origin, but rather that it is growing on tuberculous soil and that it is possible that the eye lesion is of the same origin. At what point can a primary tuberculous focus strictly localized in the eye give a positive reaction? As an additional test he suggests a return to the method recommended in 1903 by Prof. Gourfein, namely inoculation of aqueous humor from the suspected eye into the iris of a rabbit. *J. B. Thomas.*

Lo Cascio, G. **Examination of the indirect visual acuity.** Ann. di Ottal., 1927, v. 55, July-August, pp. 489-493.

The author used Calderaro's method of determining the visual acuity in different parts of the field. Rather than use an object of the same size at different distances, to avoid accommodation he found it more convenient to use test letters of different size at a constant distance from the eye. A large cross was used at a distance of five meters, the cross being marked according to the visual angle so that the test letter could be placed at any desired distance from the fixation point. In practice the method is only applicable to parts of the field immediately around the macula, as the vision thirty degrees from the macula is less than one-tenth and the determination of this would require too large a letter. If larger areas must be examined, the author advises using the same apparatus at a distance of one meter. *S. R. Gifford.*

Speciale-Picciche, P. **On the possibility of obtaining radiograms of the globe.** Ann. di Ottal., 1927, v. 55, July-August, pp. 600-607.

Attempts to obtain pictures of the globe by injection of gas and water into the orbit and in Tenon's capsule were without success, on account of the dense shadow of the bony orbit. But injection of lipiodol in several portions of Tenon's capsule, in the cadaver and the living subject, permitted a distinct shadow of the globe to be seen on the radiogram. This was not so dense as to obscure the denser shadow of a metallic foreign body in front of it. Two cases are described in which the method permitted localization of a small foreign body just outside the globe. The injection is made between the insertions of the two recti nearest the supposed site of the foreign body, the needle being held close to the globe, and is followed by massage of the eye under the closed lids. If the whole outline of the globe is not desired, one or more small drops of lipiodol may be injected at given points under the conjunctiva, their shadow marking these points on the x-ray as is done by metallic markers, placed subconjunctivally. The injections are not painful. *S. R. Gifford.*

2. THERAPEUTICS AND OPERATIONS

Alexander, W. **Ganglion injection in painful eye conditions.** Med. Klin., 1927, v. 48, July, p. 1103.

The author reports two cases of painful eyeballs which were treated by alcohol injections into the first, second, or third branch of the gasserian ganglion, with relief from all pain. He discusses use of the method in different ways, and the illustrations and x-rays show the technique. It is indicated in painful conditions of the eyes, in eyes with vision, for cosmetic results, also in cases with tumors, in panophthalmitis, in sympathetic ophthalmia, and even in suppurative eye conditions. A full bibliography is given.

Beulah Cushman.

Duke-Elder, W. S. **Ultraviolet light in the treatment of ophthalmic disease.** 1. General phototherapy. Brit. Jour. Ophth., 1928, v. 12, June, p. 289.

This is an interesting contribution based on the author's observation of a series of 425 cases, 306 treated by general light bath alone, and 119 treated, some entirely by local phototherapy and some by a combination of the two methods.

The response to radiation is partly photochemical and partly photoelectrical. The chemical effect probably increases the nonspecific immunity of the body and has a pronounced effect on vitamine activity. Clinically the most obvious effect is the production of erythema, which is registered in four degrees of severity. A second and extremely important effect is the production of an increase in the bactericidal power of the blood. The dosage is individualistic and during the course of treatment a patient develops a certain immunity. Before beginning treatment the initial dose is estimated by exposing four small areas on the arm for two, four, six, and eight minutes respectively. The beginning dose averages a duration of three minutes. The body is divided into three areas, each being treated on successive days. Goggles with Crookes lenses and side pieces are worn.

The cases treated were as follows: iritis and iridocyclitis, 102; choroiditis, 16; sympathetic ophthalmitis, 1; retrobulbar neuritis, 3; vitreous hemorrhage, 2; scleritis, 4; sclerokeratitis, 9; tuberculous keratitis, 2; phlyctenular keratitis, 104; interstitial keratitis, 10; recurrent corneal ulcers, 23; acne (corneal), 1; corneal opacities, 6; blepharoconjunctivitis, 19; recurrent hordeola, 2; tuberculous dacryocystitis, 2.

With judicious use, ultraviolet effects can be powerful for good, but they have their limitations and they always stop short of the marvellous. Care and experience are essential for best results. It is an adjunct of considerable value, and particularly is this true in tuberculous disease. In phlyctenular disease it is the treatment of choice. While its use in acute cases frequently leads to good results, its greatest use is to be found in the treatment of chronic infections. It has been found to be the deciding factor on the side of recovery. (See also p. 656.)

D. F. Harbridge.

Ehauekim-Shlykova, B. D., and Adelson, T. U. **The use of Besredka's bouillon-vaccine in ophthalmic practice.** Archiv Oftalmologii (Russian), 1928, vol. 4, pt. 2, p. 266.

Autogenous and heterogenous bouillon vaccines have been used in the form of eye drops, ointments, and dressings in the treatment of eye diseases in eighty-nine patients. The results were good in infected corneal ulcers, and satisfactory in chronic blepharitis, while chronic conjunctival conditions did not respond readily to the treatment and in purulent dacryocystitis the improvement was only temporary. *M. Beigelman.*

Gasteiger, H. **Local immunization in the eyes.** Arch. f. Augenh., 1928, v. 99. May, p. 219.

Gasteiger reviews the literature on this subject and reports his own experiments. He concludes that the possibility of specific immunization of the cornea must be denied. In the work on the inner portion of the eye, there was also no evidence that immunity was produced. The therapeutic value of these preparations must be granted, but must not be regarded as specific.

F. C. Cordes.

Gill, W. D. **A way to keep the eyelids closed after "infiltration anesthesia".** Arch. of Ophth., 1928, v. 57, pp. 269-271.

To prevent lagophthalmos and consequent injury to the cornea, the author recommends the use of flexible collodion applications to the eyelashes after operation where akinesis of the orbicularis muscle has been practiced.

The reviewer has observed contractile collodion used in this manner by A. E. Ewing for many years, and has himself followed this practice in all cases where bandaging is required.

M. H. Post.

Mirimanoff, A. **Diathermy in opthalmology.** Rev. Gén. d'Opht., 1927, v. 41, March, p. 7. (bibl. 42 refs.)

The author defines diathermy and maintains that it is the only thermotherapy that is truly deep in its action. It causes an elevation of temperature in the very midst of the tissues which its current traverses. Its field of use has extended steadily for fifteen years and it has become one of the most powerful agents of physiotherapy.

The following are the general indications for medical diathermy: local and general hypothermy; glandular insufficiency; dystrophies; circulatory insufficiency; all states of subacute and chronic inflammation; resorption of exudates; pain of all kinds; all kinds of hyperexcitability and hypertony of the musculature.

The contraindications are: recent hemorrhage or hemorrhagic affections; arteriosclerosis; acute infections; anesthesias; glaucoma and the preglaucomatous state.

Then follows a history of experimental data, the effects of diathermy on the ocular tissues, the pupil, the intraocular tension, etc. It is noted that diathermy raises decidedly the albumen content of the aqueous. The author believes that it should displace all other thermic means of treatment. Excellent results are reported in many forms of ocular disease, but especially in episcleritis, rheumatic iridocyclitis, vitreous opacities, and ocular neuralgic pain.

Diathermocoagulation or surgical diathermy with its applications is described. It is said to have many advantages over other destructive methods. Its use in ophthalmology is only four or five years old. The results are particularly favorable in retrobulbar and orbital tumors and in improving enucleation cavities by severing old bands of scar tissue which have no tendency to reunite after diathermocoagulation. *J. B. Thomas.*

Oguchi, Ch., and Nakashima, M. **The hydrogen-ion concentration of the ocular secretions, and eye medicines.** Graefe's Arch., 1927, v. 119, p. 300.

The pH or hydrogen concentration of the tears lies between about 8.4 and 8.6, or strongly alkaline. The upper limit of the alkalinity of the ocular secretions associated with bacteria is about pH 7.6 and the hydrogen-ion concentration of the usual culture medium is pH 7.4. Therefore the alkalinity of the normal tears is not favorable for the development of bacteria.

The acid reaction of eye medicines is dependent not only upon the carbonic acid in the air but evidently also upon the free ions of the solvent and the surplus acid of the dissolved substance. These acid eye medicines act more irritatingly upon the tissue than do the alkaline ones. *H. D. Lamb.*

Pages. **Treatment of so-called scrofulous and possibly tuberculous affections of the eye by general baths of ultraviolet rays.** Arch. d'Opht., 1928, v. 45, April, p. 236.

The patients were diagnosed clinically as having lesions due to the tubercle bacillus. The thirteen observations included phlyctenular conjunctivitis, interstitial keratitis, iridocyclitis, and choroiditis. The most striking results were obtained in the patients with phlyctenular conjunctivitis. The treatment consisted of general body exposure, both front and back, to a mercury lamp of three to four thousand candles. The duration of the first exposures was about five minutes at one meter, working up to thirty minutes or more in from fifteen to twenty treatments. At times the phlyctenules disappeared after the first or second treatment, but the exposures were continued in order to build up the resistance of the individual against the tubercle bacillus. Local treatment with the ultraviolet ray was considered too dangerous. Those patients cured have remained so for one year or more.

M. F. Weymann.

Riehm, W. **Rôle of tuberculin in the normal and in the morbid organism.** Zeit. f. Augenh., 1928, v. 64, March, p. 205.

This analysis of the probable action of tuberculin, forming a credo on which to base our judgment in interpreting reaction to tuberculin used diagnostically and therapeutically, is not suitable for abstracting and must be read in the original. *F. H. Haessler.*

Satanowsky, Paulina. **Treatment of ocular tuberculosis with tuberculin.** Arch. de Oft. Hisp.-Amer., 1927, v. 27, Feb., p. 94.

The authoress advocates the use of tuberculin in establishing the nature of chronic affections of the iris, sclera, ciliary body, or choroid. To justly appraise the reactions it is preferable to employ known solutions, in definite quantity, and to be assured that the total amount is absorbed. This is accomplished by the intradermal reaction of Mantoux, rather than by the cuticular reaction of Pirquet.

The method for the preparation of tuberculin in varying dilutions is given, using the old tuberculin of Koch as the basis. Of the 1:1000 solution, 0.1 mg. is injected intradermally and the reaction is regarded as positive if at the end of forty-eight hours there is present a papulomacule from 1 to 1.5 cm. in diameter. It was observed by Mantoux that in the presence of ocular affections with little or no extraocular localization the reaction was sometimes delayed, perhaps beginning on the fourth day and reaching its maximum on the fifth.

When the diagnosis is established treatment is begun with subcutaneous injections of the weak solution, and continued at the rate of two each week, preferably over a period of five months. General reactions should be avoided by keeping the dose sufficiently reduced. The method has been particularly effective in chronic uveal conditions.

A. G. Wilde.

Schoenberg, Mark J. **Experience with ephedrin in ophthalmic practice.** Arch. of Ophth., 1928, v. 57, pp. 272-274.

The numerous valuable properties of ephedrin from an ophthalmological standpoint are reviewed by the writer at some length. Its action resembles that of adrenalin in that it stimulates the nerve endings of the sympathetic system. It dilates the pupil of the normal individual without producing cycloplegia. It does not blanch the conjunctiva, but as a hemostatic, a one per cent solution has about the same effect as a one to one thousand solution of adrenalin. The effect is slower and more prolonged. *M. H. Post.*

Smith, D. Priestley. **A new operating loupe.** Brit. Jour. Ophth., 1928, v. 12, May, p. 257

The author has devised a spectacle frame with a rigid scaffold extending out from the tops of the rims. In the extended portion is held, eight to ten cm. from the eyes, a pair of magnifying lenses. (One illustration.)

D. F. Harbridge.

Zamkovsky, T. G. **Experimental investigation of the influence of one per cent atropin injections upon the blood vessels, aqueous humor, and ciliary body, and also upon the intraocular pressure of normal and hypotonic eyes.** Archiv Oftalmologii (Russian), 1928, v. 4, pt. 1, p. 29.

After a subconjunctival injection of 0.5 of an isotonic one per cent solution of atropin the author found in rabbits a considerable congestion of the iris, which lasted two to four days. An identical retrobulbar injection produced a dilatation of the blood vessels of the optic disc.

Subconjunctival as well as retrobulbar injection of 1:1000 atropin solution did not have any influence upon the tension of normal eyes in rabbits.

M. Beigelman.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Blanco, Tomas. **Vision and evolution.** Arch. de Oftal. Hisp.-Amer., 1926, v. 26, Dec., p. 693.

A general description is given of the visual apparatus as seen in the simpler forms of life, and its development is outlined in regard to both the external organs and the internal nerve connections up to the primates. The paper concludes with a discussion of stereoscopic vision. *A. G. Wilde.*

Druner, L. **An aid to presbyopic vision.** Münch. med. Woch., 1928, Feb., no. 6, p. 264.

Elsner's observations (see in this section), are incompletely and incorrectly interpreted. A presbyope is able to read better in a bright light because the pupil, being contracted, increases the sharpness of images and does away with fusion circles. The same effect is obtained by a slit or hole, especially the latter.

The author disagrees with Elsner in regard to the lens giving two images. He advises the artificial formation of a small pupil in the following manner: Take two quadrangular pieces of black paper, cut a small triangle in the center of each and place the papers one on top of the other so that the apices of the triangles are superimposed and form a small quadrangle. By moving the papers to and fro, a quadrangle of any size can be obtained.

However, this only helps the patient for a short while and will not do for any prolonged reading. The best thing is to have a pair of glasses in reserve for emergency cases. As far as a slit is concerned, one can be formed by partly closing the lids, as myopes often do. *M. L. Folk.*

Elsner, K. I. **An aid to presbyopic vision.** Münch. med. Woch., 1928, Jan., no. 3, p. 136.

(See also Druner in this section.) Helmholtz and others have discussed the fact that people with visual errors, especially presbyopes, can see much better when looking through a slit or hole This phenomenon, however, has been studied very little and has never been put to practical use.

The author advises the simple formation of a slit by placing the patient's hand horizontally in front of one eye (the other being closed), palm outward, making a narrow slit between the index and middle fingers. If the light is good, the patient will see much better and wil' even be able to read small print. Of course, this to be used only in cases of emergency, e.g., when glasses are broken or lost.

The explanation of the phenomenon according to Elsner is as follows: The crystalline lens gives a double image; one through its upper part which is hazy, the other through the lower part which is clear. Through the slit the upper image is excluded, leaving only the lower one which is clear and sharp but is poorly illuminated, and that is why a good light is necessary.

M. L. Folk.

Frenkel, Henri. **Monolateral myopia.** Arch. d'Opht., 1928, v. 45, April, p. 209.

A statistical study of the refraction of 36,573 patients was made with spe-

cial reference to the occurrence of myopia. The percentage of pure monolateral myopia was 11.45. It occurred more frequently in women than in men and appeared most often in the right eye. The lower grades were attributed to overuse of the eyes for close work, but in the high grades there seemed to be hereditary influences. For the prevention of this condition it was proposed that early examination of the eyes and hygienic measures, including refraction, should be used. As to adults with a marked anisometropia, it was often impossible to make them comfortable when wearing a full correction of the myopic eye.

M. F. Weymann.

Lasareff, P. **Investigations on the ion theory of stimulation.** Ninth communication: **On the theory of dark adaptation following exposure to light.** Pflügers Arch., 1926, v. 213, pp. 256-261.

A mathematical presentation showing a similarity between the theoretical curve of adaptation and that obtained by Nagel, based on the assumption of a synthesis of pigment according to a monomolecular equation. No new experimental data. *F. H. Adler.*

Marshall, Wilfrid. **Color vision after intravenous injection of santonin.** Jour. Pharmacol. and Exp. Therap, 1928, v. 32, pp. 189-203.

Injection of ten mg. of santonin intravenously in a human subject shows a primary effect on the perception of violet. As a consequence of this the well known xanthopsia arises. This action of santonin is regarded as being on the retinal elements, associated with the mechanism of perception of "self-light," and is compared with physiological fatigue of violet perception. The action may be due to the transformation of santonin into some other substance, probably the allied color compound. *F. H. Adler.*

Morse, Samuel. **Myopia as a disease which may be preventable.** Amer. Med. 1928, Feb., p. 115.

The writer approves Fuchs's dictum: "Even if straining the eyes for near work is the main cause of myopia, it cannot be the sole cause, since not all but only a fraction of those who are subjected to this strain actually become nearsighted." Close cooperation of the pediatrician in the care of adolescent children, and the cooperation of the internist in older children, is suggested with a view to obtaining further enlightenment as to the cause and progression of myopia and the control of these factors. *D. H. O'Rourke.*

Nakagawa, H. **Evolution of heat in the eyeball.** Acta Scholae Medicinalis, University of Kioto. 1927, v. 9, p. 421.

The production of heat during functional activity has been studied chiefly in the muscles. When produced in the retina by a flash of light it may be measured by a mirror galvanometer. The experiments of Nakagawa were made on the extirpated eyes of toads. Heat radiations were screened out by water and the light concentrated on the eye. The eye was dark adapted by covering with black paper for twenty minutes, which also secured a constant temperature. The light was allowed to fall on the eye for six seconds and then shut off.

The conclusions reached were: When the extirpated eyeball of the toad is illuminated, there is evolution of action current and also production of heat, which follows a certain course.

If the illumination lasts for about six seconds, the production of heat in the eyeball reaches the maximum in about eight seconds after the illumination is commenced, and then begins to fall, the whole process being finished in about thirty seconds. *E. J.*

Price, J. P. **Trial frame on headband.** The Lancet, 1928, Feb. 18, p. 344.

To estimate the refraction of school children by retinoscopy, Price has used an ordinary trial frame supported by a headband, which can readily be fitted to the varying sizes and shapes of the head. After using for a year such a frame, made by Down Bros. of London, he confidently recommends it as remaining firmly in position. The illustration of the frame shows a swinging disc to shut off each eye and compel fixation of the eye examined.

E. J.

Roggenbau, C., and Wetthauer, A. **Temperature changes in the refractive media of the eye after exposure to a luminous body.** Zeit. f. Augenh., 1928, v. 64, Feb., p. 143.

Calves' eyes were exposed to light emitted from a sheet of platinum foil kept incandescent by means of a Bunsen burner. Excess heat was screened off with asbestos and the eyes were kept moist by drops of saline solution. Many curves give the detailed results of the study. In general it was shown that the temperature of the posterior tissues rises very slowly and only after radiation of long duration. The temperature rise of the posterior tissues depends most upon the time of radiation, also on the initial temperature of the tissue, and scarcely at all on the temperature of the column of air between the eye and the luminous body.

F. H. Haessler.

Sanyal, Saradindu. **Eyestrain, its effect on light sense.** Calcutta Med. Jour., 1928, March.

Ophthalmoscopic signs are held to be wanting in eyestrain except in very severe cases, but measurements of the light sense with special reference to light minimum perception including color tests of blue, red, and green indicated that the mildest types of asthenopia showed diminished sensitiveness to blue only. These never showed typical ophthalmoscopic changes. The more severe cases showed also a diminished sensitiveness to green. Here again no ophthalmoscopic change was found. The extreme cases of eyestrain showed diminished sensitiveness to red, and most of these showed definite ophthalmological changes.

L. T. P.

Schiøtz, Hjalmar. **Skiascopy.** Acta Ophth., 1928, v. 6, no. 1, pp. 5-10.

Schiøtz describes the method of practice in the use of the plane mirror and artificial eye and discusses briefly the optical principles involved. The article contains nothing essentially new.

E. M. Blake.

Soriano, F. J. **Light sensitivity.** Arch. de Oft. de Buenos Aires, 1928, v. 3, Jan., p. 146.

This is a detailed article viewing the subject of light sensitivity from the following angles: (1) general features; (2) adaptation of the retina to variations in light intensity; (3) methods for examining the relation of the visual apparatus to variations in intensity of illumination; (4) pathological significance of abnormal changes in adaptation to light.

Under "general features" the physiology of the visual apparatus in its reaction to light is carefully reviewed, as well as the various theories relating to color vision. The variations in color and light sensitivity of the macular and peripheral portions of the retina are well brought out.

In studying the phenomena of light perception the author divides the subject into two portions: (1) the power to perceive differences in brightness; (2) the least degree of illumination that can be perceived. The latter can in turn be divided into two distinct features: (1) the minimum threshold of light perception; (2) the exact lower limit of light differentiation. Both of these powers depend upon the adaptability of the retina to light.

Whenever it is suspected that the light sensitivity is subnormal, the visual field should be carefully taken for both white and colored objects in varying degrees of reduced illumination, and the result compared with a

known normal eye under identical conditions. When the light sensitivity of the periphery of the retina is altered, there occurs a narrowing of the entire field, especially for colors. Scotomas for colors are much more marked in both extent and degree when they are delimited under relatively decreased illumination.

The degree of light sensitivity in different conditions does not vary strictly in accordance with central visual acuity. The patient should first remain in darkness for at least twenty minutes before his perception of minimum illumination is determined. This is then carefully compared with a normal eye under identical conditions.

Hemeralopia and nyctalopia are discussed in some detail. *A. G. Wilde.*

Sourasky, A. **Race, sex, and environment in the development of myopia.** Brit. Jour. Ophth., 1928, v. 12; April, p. 197.

This is an excellent contribution. During the school age Jewish boys do an unusual amount of close work due to the added evening study of Hebrew. In a series of one thousand six hundred and forty-nine Hebrew boys examined as against six hundred non-Jewish boys, 43.2 per cent of the former and 21.7 per cent of the latter showed visual defects.

In another series of five hundred and sixteen Jewish and eight hundred and ninety-two non-Jewish children between the ages of five and fourteen years a comparative study was made of the type of refractive error among the defectives. In an additional table these comparisons are made by dividing the cases into two periods: five to nine and ten to fourteen years. In another section the investigator analyses the refractive errors present in relationship to sex.

This heavy incidence of defects among Jewish boys is stationary all through their school life; it is practically no heavier at the age of fourteen than it is at seven years. The incidence of the defect is therefore not increased with school life and attendant excessive close work. Comparative analysis of the refractive errors seen among the two racial groups varies little however, apart from a rather higher incidence of myopia and of low hypermetropia among the Jewish children. There is but little difference in the percentage of myopes in the early years of school life (five to nine) between the two groups. The greater incidence among the Jewish becomes more marked in later years (ten to fourteen).

It is argued that the greater increase of myopia in the later years among Jewish children is not the result of excessive close work, but of the greater incidence of low hypermetropia among the young Jewish children. When the analyses are carried further to bring out any distinction in the increase of the number of myopes among Jewish boys as compared with girls, it is found that the increase is decidedly greater among the boys (who do much more close work). However, the same is seen to be true of the non-Jewish boys (who do not do an excessive amount of close work) as compared with the non-Jewish girls. It is therefore suggested that there is a sex-determined factor which controls the growth of the eye.

The excessive incidence of myopia among Jewish boys is explained by the racial factor of the great prevalence of low hypermetropia and the sex-determined (and nonracial) factor which allows for a greater or longer development of the length of the eye.

D. F. Harbridge.

4. OCULAR MOVEMENTS

Diaz-Caneja. **Stereoscopic vision.** Arch. de Oft. Hisp.-Amer., 1927, v. 27, Jan., p. 1.

The history of our conceptions of stereoscopic vision is reviewed, beginning from earliest times down to modern conclusions. Physiological diplopia is explained, and the historical development of its recognition traced. The methods of localization of real and false images in pathological diplopia

are entered into rather in detail, as well as the psychic process concerned in their projection.

The article is replete with diagrams illustrating various phases of the subject, and the whole is presented in a complete and scholarly manner. The author devotes some space to monocular stereoscopic vision, defining it as the gradual development of an approximate power to estimate distance and depth, chiefly from comparison of the relative sizes of known objects. In this varying degrees of innervation are called into play, and muscle sense is also an undoubted factor. The article closes with an extensive bibliography.

A. G. Wilde.

Santa Cecilia, J. **Negro's sign in facial paralysis.** Arch. de Oft. de Buenos Aires. 1928, v. 3, April, pp. 325-334.

The author presents a new explanation of Negro's sign in facial paralysis. Since the orbicular muscle is paralyzed, its antagonist, the levator, is in a state of hypertonicity and an equal impulse to both levators produces a greater effect on the paralyzed side. In view of the anatomical connection between the levator and the rectus superior, the hypereffect is true also in regard to the latter, hence a greater rotation upward of the eyeball on the affected side.

M. Beigelman.

Schiøtz, H. **The cause and development of concomitant strabismus.** Acta Ophth., 1927, v. 5, nos. 1-3, pp. 285-292.

The cause of concomitant strabismus is believed by Schiøtz to be due to a faulty position of the globe which originates during fetal life and is brought about by some unexplained force pulling the eyeball into an abnormal position. When divergent strabismus develops it is due to the decrease of hypermetropia or development of myopia being added to a latent excessive divergence power. Convergent strabismus is explained by close use of the eyes, which often possess twenty diopters of accommodation in infancy, superadded to an excessive convergence power. In congenital convergent strabismus there is eccentric vision in one eye with a central scotoma. The term heterophoria and its subdivisions should be replaced by "latent strabismus convergens, divergens," etc.

E. M. Blake.

Sommer, J., and Segaller, Miron. **Familial nystagmus.** Ann. d'Ocul., 1928, v. 165, March, pp. 196-200.

Three families in which there were several cases of nystagmus are cited. In each case there were other ocular anomalies which had a familial similarity. The nystagmus appeared at about four months, the time of appearance of fixation of the eyes. This late appearance does not argue against the hereditary nature of the trouble. There was always an associated amblyopia. This disease is independent of hereditary maladies of the central nervous system.

L. T. P.

Ström, J. **The topography of an after image in a dark field uninfluenced by voluntary eye movements or labyrinthine and other impulses.** Skand. Arch. Phys., 1927, v. 50, pp. 1-7.

By gazing at a lamp filament an after-image is produced, the movements of which are observed by the subject in a dark room with eyes closed. In 61 of 66 cases a constant direction was taken by the after-image. This points to a constant asymmetry in the tonus of the ocular muscles. Of these 61 cases 32 showed movement toward the right and 17 to the left, and 5 showed no constant deviation.

The author explains the preponderance of right lateral movement as due to the muscles used in turning the eye to the right having an increased tonus from their use in reading.

F. H. Adler.

Willy, Heller. **Two cases of chronic progressive ophthalmoplegia.** Zeit. f. Augenh., 1928, v. 64, Feb., p. 136.

Two cases reports, as well as a review of some of the opinions expressed in the literature, on the basis of which the author comes to the conclusion that, in analogy with congenital nuclear aplasia, these cases have an embryonal origin in cell inferiority, in the sense of the abiotrophy of Gowers.

F. H. Haessler.

5. CONJUNCTIVA

Dusseldorp, M. **Acute follicular conjunctivitis with adenopathy.** Arch. de Oft. de Buenos Aires, v. 3, no. 3. p. 175, 1928.

Two cases of a peculiar syndrome are reported. The eyelids were greatly swollen, the conjunctiva congested and covered by numerous follicles, particularly abundant in the lower cul de sac, and the preauricular and cervical glands were markedly enlarged. A biopsy of the conjunctiva was performed in one case, and a diffuse infiltration with the formation of follicles was found.

M. Beigelman.

Dusseldorp, M. **Ocular complications of American leishmaniasis of the skin.** Arch. de. Oft. de Buenos Aires, 1928, v. 3, Mar., p. 289.

Conjunctival involvement by the Leishman-Donoval body is so rare that the author has been unable to find a previous case described. The one here reported occurred in a twenty-five year old man, who six years previously had noticed an involvement of the alæ nasi and adjacent parts of the upper lip. It later spread to the left lower lid, conjunctiva, and cornea.

The conjunctiva was thickened and congested, with numerous yellowish points, and several narrow cicatrical lines. The lower portion of the cornea was leucomatous, and was so vascularized that the iris was scarcely visible. There was an exquisitely tender granulating mass extending from the semilunar fold to the external canthus, containing yellowish areas, which later ulcerated and produced a whitish discharge.

A portion of this mass was excised for histologic study, the results of which are reported. No Leishman bodies, blastomycetes or acid-fast organisms were found. The results of treatment are not reported. There are two paragraphs of the infected eye, and three of the stained sections.

A. G. Wilde.

Rechnitzer, S. **Concerning the effect of mechanical interference in trachoma.** Med. Klin., 1927, v. 48, Nov., p. 1692.

Throughout the ages the mechanical treatment of trachoma has shown better results than almost any other line of treatment, and in a trachomatous country (Ruma, Jugoslavia) for many years, with much satisfaction, the author has used Keining's method of wrapping cotton about a glass rod and rubbing the affected conjunctiva and tarsal folds until they bleed freely. This treatment is used in all stages, with marked alleviation of symptoms, and marked change in the course of the condition. The hypothesis of this reaction no doubt is the active infiltration of the congested tissue with fresh blood.

Beulah Cushman.

Seefelder, R., and Berger, W. **Contributions to the knowledge of rare conjunctival diseases: vernal catarrh and hyaline degeneration of the conjunctiva.** Arch. f. Augenh., 1928, v. 99, May, p. 91.

Seefelder and Berger report two cases of vernal catarrh studied in great detail. Particular emphasis is laid on the possibility of vagotonia and idiosyncrasies as possible etiological factors. The vagotonic disposition can be regarded as only a link in the etiological chain. The periodic appearance causes one to look further. The fact that time of year, location, and eosinophilia had a bearing in an individual subject to urticaria and in whom a family history of bronchial asthma was present brings up the possibility of a specific idiosyncrasy which they were not able to demonstrate.

In addition, the authors report a case of hyaline degeneration of the conjunctiva. *Frederick C. Cordes.*

6. CORNEA AND SCLERA

Dusseldorp, M. **Cutaneous leismaniasis with ocular complications.** Arch. de Oft. de Buenos Aires, 1928 v. 3, March, pp. 288-294. (See Section 5, Conjunctiva.)

Fischer, E. P. **The structure of the corneal surface and its pathological changes as noted by reflex photography.** Arch. f. Augenh., 1928, v. 98, Feb., p. 1.

Fischer has devised a most ingenious apparatus for photographing the corneal light reflex under normal and pathological conditions. The original work was done with rabbits' eyes in which changes were produced by pressure, drying, trauma, chemical reactions, and changing the contents of the anterior chamber. Following this, the human corneal reflex was photographed.

The article contains many excellent photographs of the change produced in the corneal reflex by erosions, ulcers, herpes, and the various types of keratitis. In many of these, the changes during the course of the disease are recorded.

Photography of the lens reflexes was also attempted, but not successfully.

Frederick C. Cordes.

Fox, L. W. **Bilateral cysts of the cornea.** Brit. Jour. Ophth., 1928, v. 12, May, p. 249.

A search of the literature reveals the fact that this condition is very rare indeed. The reported cysts were true cysts lined with endothelium. The cyst in the observer's case was in reality a separation of the lamellæ of the cornea. A girl aged eleven years who had had an unsuccessful double advancement presented heapings up of the conjunctiva at the sites of anchorage. At the site of anchorage in the left eye was observed a V-shaped separation of the sclera. This separation extended into the cornea, giving it a steamy aspect. With the slit-lamp the corneal segment became two—one with the convexity anteriorly and the other with the convexity posteriorly—showing that here was a cyst. As the apex of the steamy area was approached, at the center of the cornea, the images fused. The limbs of the V-shaped area showed presence of blood vessels. The cyst between Bowman's and Descemet's membrane was presumably connected with the vitreous, or at least with the subretinal space. The condition showing evidence of being progressive, a small angular keratome was passed into the cornea at the upper margin on the temporal side of the steamy area. The point was then turned down so that it reentered the cornea from above and opened the cystic cavity vertically. The blood supply along the lower margin of the V was cut with a Stevens scissors. The entire cyst collapsed. Some eighteen months later the cornea showed a small dense white scar.

D. F. Harbridge.

Koby, F. E. **Pathogenesis of fusiform pigmentation of the posterior surface of the cornea.** Rev. Gén. d'Opht., 1927, v. 41, Feb., p. 4, and Sept., p. 24.

The author summarizes the observations of Krukenberg, Vogt, and others concerning a particular pigmentation of the cornea sometimes called (improperly) "melanosis of the cornea," sometimes "pigmented spindle of Krukenberg." He adds several cases of his own and notes the divergent opinions of authors on the pathology of the condition. Two of his own cases observed before and after the formation of the pigment spindle refute the theory of congenital origin.

In the etiology two factors come into play: (1) the physiologic current of the aqueous, of thermic origin; (2) extraordinary pigmentary degeneration, as in myopia, uveitis, glaucoma. Women are more often affected than men and three double observations reporting the spindle in mother and daughter

suggest that the pigmentary degeneration may be hereditary and present a sex-linked dominance. This would be of especial interest because of all hereditary characters, normal or pathologic, studied in man, none follows this mode of transmission, i.e. from mother to daughter. There is no reported case of transmission from father to son.

In a second paper the author discusses three new personal cases, all myopes. In two of them there was a ring of brown pigment granules on the posterior surface of the lens capsule, as well as on the cornea. Is there a physiologic current within the vitreous, and what is its nature? *J. B. Thomas.*

Marchesani, O. **Fever therapy in parenchymatous keratitis.** Arch. f. Augenh., 1928, v. 99, May, p. 207.

Marchesani reports fifteen cases of parenchymatous keratitis treated with typhoid vaccine given intravenously, the dose varying from one hundred and fifty to five hundred million. Four of the cases showed at the time of the fever a marked sudden increase in the infiltration, and in two cases a hypopyon developed. This must be regarded as a local reaction and is to be avoided. On the whole, the treatment seemed beneficial. The average time of illness was reduced to two and one half months, and fifty per cent of the cases remained monocular. The visual results seemed to be above normal. Marchesani feels that this type of therapy has a definite value but must be used with extreme caution.

Frederick C. Cordes.

Oast, S. P. **Blue sclerotics and brittle bones.** Report of occurrence in mother and child. Arch. of Ophth., 1928, v. 57, pp. 254-261.

In this paper the author reviews the literature in considerable detail. The various theories propounded to explain the etiology are mentioned, but no deductions are drawn from them. One case is presented. *M. H. Post.*

Peters, A. **Colloid deposits in the cornea in buphthalmos.** Arch. f. Augenh., 1928, v. 99, May, p. 235.

Peters reports two cases of buphthalmos in which colloid deposits were found in the cornea. This is the first time these have been noted in buphthalmos. The author regards them as degenerative changes.

Frederick C. Cordes.

Pières, L. **Operative treatment of lesions of the cornea produced by acne rosacea.** Arch. d'Opht., 1928, v. 45, p. 308.

A discussion of present views of the cause of acne rosacea disclosed disagreement among dermatologists. The writer concludes that the disorder may be due to poor endocrine balance, as it occurs most often in women during the menopause. Among his cases it was also present more often in Jewesses. Ten cases are reported in which the eyes were affected, particularly by opacity developing in the cornea. These were treated by excising a ring of conjunctiva and replacing it by a graft of mucous membrane from the lip. Detailed operative technique is not given. The results were very satisfactory in that the process subsided and vision improved.

M. F. Weymann.

Sacha, A. **Peripheral degeneration of the cornea.** Bratislavské Lek. Listy 1928, v. 8, Jan., pp. 22-30.

In the first case almost the whole periphery of the cornea of the right eye was greatly thinned and depressed, while in the left eye the thinnest places were ectatic. The sensibility of the cornea was materially reduced, and was entirely absent at the thinned areas. In the left eye there was a marginal ulcer affecting only the part of the cornea which was not abnormally thin, but which corresponded in location to the ectatic portions. The case is regarded as a further proof of the clinical unity of the pictures of peripheral corneal ectasia and grooves. In the second case there was a groove but no

bulging and the thinned portion showed a uniform granular opacity.

W. H. C.

Sallmann, Ludwig. **A complication with Sondermann's trephining in ulcus serpens.** Zeit. für Augenh., 1926, Nov., v. 60, p. 284.

In two cases of pneumococcus ulcer in which the author trephined the cornea he feels that the result was neither better nor worse than would have resulted from repeated simple puncture of the anterior chamber. In a third case the therapy was ineffectual, and in a fourth a panophthalmitis resulted. The lens capsule had been injured in the trephining, an accident which is apt to occur even when the operation is very skilful. He points out that lens matter is an excellent culture medium, and that free lens matter in an infected eye is a decided menace.

F. H. Haessler.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Bedell, A. J. **Photographic history of a traumatic retinochoroiditis.** Arch. of Ophth., 1928, v. 57, pp. 262-264.

This paper is a description of an interesting series of photographs of the living fundus, showing the migration of chorioretinal pigment. Its interest is largely dependent upon the photographs and it therefore does not lend itself to abstraction. *M. H. Post.*

Franchetti, A., and Wieland, H. **Quantitative estimation of the albumin content of the intraocular fluids by the nephelometer.** Arch. f. Augenh., 1928, v. 99, May, p. 1.

Franchetti and Wieland estimated the albumin content of the intraocular fluids with the nephelometer of Kleinmann. In the rabbit they found the aqueous to contain 0.05 per cent and the vitreous 0.012 per cent. In congenital hydrophthalmus, this increased to 0.13 per cent in the anterior chamber and to 0.021 per cent in the vitreous. There was also a definite increase following puncture of the chambers, with a gradual return to normal.

In the human eye, the albumin content of the aqueous varies between 0.019 and 0.034 per cent. Following puncture of the anterior chamber, there was a definite increase. In acute glaucoma, the albumin content varies between 0.213 and 0.457 per cent. Following puncture, it increased to between 0.414 and 0.767 per cent.

Frederick C. Cordes.

Guillery, H. **Sympathetic ophthalmia in rabbits.** Arch. f. Augenh., 1928, v. 99, May, p. 63.

Guillery produced sympathetic ophthalmia in rabbits and studied the eyes clinically and histologically. With his method, he was able to produce involvement in the second eye in twenty-three instances. In the beginning, these showed a toxic type of hemorrhage, and in the more advanced cases the usual changes of frank sympathetic ophthalmia with the typical cell formation and foci. In seventy per cent of all cases, the processes went on to the final picture, and in only fifteen per cent did the second eye show no histological evidence of sympathetic ophthalmia.

Guillery states that the sympathetic inflammation produced in rabbits by his method can not be differentiated either clinically or histologically from sympathetic ophthalmia of the human eye. He concludes that this disease of rabbits' eyes is analogous with human sympathetic ophthalmia.

Frederick C. Cordes.

Knapp, Arnold. **Report of a case with angiomatous changes in the iris.** Arch. of Ophth., 1928, v. 57, no. 3, p. 219.

The especially interesting thing about the case reported in this paper was the presence of many greyish, somewhat translucent nodules scattered irregularly about the surface of the iris On microscopic section they were found to be due to the thickening of the iris following proliferation of

endothelial cells and many new-formed vessels. This case differed from the thirteen previously reported cases in the presence of these nodules. Glaucoma was found and the eyes were trephined without difficulty. The angiomatous changes in the periphery of the iris, obstructing the excretory channels, are probable causes for glaucoma in these cases. The article is illustrated by a beautiful colored plate of the iris described. *M. H. Post.*

Young, George. **A case of sympathetic ophthalmitis.** Brit. Jour. Ophth., 1928, v. 12, May, p. 254.

From the author's experience he expresses the view that it might actually prove correct to remove the first eye, vision or no vision, even as soon as the earliest signs have appeared in the second eye. In support of this view he cites the instance of a man aged seventy-two years who received a glass injury in the region of the ciliary body. About two months later, with the slit-lamp, keratitis punctata was observed in the injured eye. The fellow eye was free from ciliary injection, and oblique illumination did not show anything, but the slit-lamp showed at the temporal margin of the pupil the minutest beginning exudate, and the posterior surface of the cornea showed several small deposits. The injured eye was immediately removed and active treatment instituted. The sympathizing eye went through an acute attack of sympathetic ophthalmitis, vision falling to 6/60. One year later vision with correction = 6/9 full. At the time of publication, after seventeen months, the eye was still quiet.

D. F. Harbridge.

8. GLAUCOMA

Laws, W. G. **A case of congenital glaucoma of unusual type.** Brit. Jour. Ophth., 1928, v. 12, May, p. 248.

A girl aged fifteen years had a semi-dilated pupil, T+1, seven to eight D. cupping of the nerve head, the retinal veins enormously distended, the arteries considerably larger than normal. V + 2. sph. = 6/12. At the 11 o'clock position the root of the iris appeared as if it were adherent to the cornea. At operation the keratome engaged in some filmy tissue lying between the cornea and the iris. Following operation, turgidity of the fundus circulation subsided, the cupping was 5.5 to 6 D., central V = 6/6 pt.

D. F. Harbridge.

Speciale-Picciche, P. **The threshold of excitation of the chromatic sense, (red and green) in glaucomatous eyes.** Ann. di Ottal. 1927, v. 55, Nov.-Dec., p. 1003.

By means of the Speciale-Cirincione chromatoscope the author causes proportionate mixtures of the spectral rays to so blend as to produce white. The average proportions required were 15 blue + 15 green + 10 to 20 red = white.

The proportion of red determined by testing ten people with normal eyes might vary from 11 to 8.5 without affecting the result. By lessening the amount of red the white would gradually take on the shade of green. By limiting the amount of green the threshold of sensation would become faintly pink. The range of variation in the media employed in the normal eye was found by the writer to be 2.40. This range was greatly increased in incipient glaucoma, amounting to a difference of 7.19. The degree of hyposensibility for red and green is looked upon by the author as a valuable diagnostic measure apparent before changes are discoverable in the visual acuity or field. *F. Park Lewis.*

9. CRYSTALLINE LENS

Atkinson, Walter S. **Two safety measures in cataract extraction.** Arch. of Ophth., 1928, v. 57, pp. 275-282.

Paralysis of the orbicularis muscle is recommended in cataract extraction, either complicated or uncomplicated. No particular method should be used in all cases. Suturing the flap, preferably by two sutures, is regarded as of great value and has been found very

simple of accomplishment after paralysis of the lids. *M. H. Post.*

Birch-Hirschfeld. **Cataract operations in the clinic of the University of Königsberg, 1915-1926.** Zeit. für Augenh., 1927, Sept., v. 63, p. 1.

This is a statistical review on data concerning 1224 cases which can be interestingly compared with similar data from other institutions. The author does not operate until he has no growth on an agar culture. The preoperative preparation is the usual but he does not trim the cilia. He uses combined iridectomy, with capsulectomy, and also more recently in 485 cases has used a peripheral iridectomy. He doubts whether the peripheral iridectomy gives best vision, though of course the cosmetic result is better. He does not agree with Elschnig that iridectomy need only be done when the pupil cannot be dilated more than six mm. A conjunctival flap is a tremendous safeguard. The eyes are bandaged lightly and are covered with wire gauze spectacles. The patients are not carried from the operating room but are allowed to walk, and even during the war, when patients had to walk downstairs and to a neighboring building, he never had an accident. In 228 eyes with juvenile cataract he used combined linear extraction. *F. H. Haessler.*

Cords, Richard. **An industrial cataract.** Zeit. für Augenh., 1926, Nov., v. 60, p. 251.

The author doubts the wisdom of W. J. Schnyder's suggestion of limiting industrial responsibility to those cataracts which show the characteristics of posterior polar cataract with splitting off of the subcapsular lamella. Until larger statistics have proved that Schnyder's contention is correct he thinks compensation should be paid for all cataracts occurring at a relatively early age in people who have worked in glassworks, rolling mills, etc. for a sufficient period of time to produce cataract. *F. H. Haessler.*

Cosmettatos, G. F. **Cataract in chronic tetany, examined with the slit-lamp.** Rev. Gén. d'Opht., 1927, v. 41, Nov., p. 29.

A man thirty years old first had spasms of the upper limbs in 1922. His vision began to fail a year later. By 1926 he walked with difficulty and a diagnosis of "latent tetany" was made. He had cataracts of both eyes of the diffuse senile type.

The slit-lamp with sixty-seven diameters magnification revealed fine opacities of the posterior zone of the lens. Magnification of 106 diameters gave more precise details. The anterior capsule was normal, the opacities of the posterior zones of the lens were plexiform, and in general cupshaped. A minute description of the opacities follows, with two illustrations. Vogt's atlas contains the report of a rare type of juvenile posterior cup-shaped cataract, caused "perhaps" by tetany. Knüpfel examined four cases of cataract with the slit-lamp, in patients with postoperative tetany, and in two of these reported faintly reticulated opacities. *J. B. Thomas.*

Dascalopoulos, Nico. **Use of adrenalin in operation for traumatic cataract.** Ann. d'Ocul., 1928, v. 165, April, pp. 251-255.

The greatest difficulty of technique in operation on traumatic cataract depends on the immediate myosis following incision into the anterior chamber. This can be obviated by the use of a subconjunctival injection of adrenalin and novocain a few minutes prior to the operation. Unless this is done, the contracted iris prolapses, with evacuation of lens cortex, and tends to cause iritis with adhesions to the remaining anterior lens capsule. *L. T. P.*

Gallemaerts, M. E. **Vascular tunic of the crystalline lens, and slit-lamp.** (42 ill.) Bull. de L'Acad. Royale de Méd. de Belgique, 1927, v. 7, Oct. 29, pp. 647-656.

This consists of a series of explana-

tions of forty-two excellent illustrations in black and white, chiefly drawings of the conditions seen with the slit-lamp in various forms of remains of the vascular tunic (pupillary membrane, hyaloid remains) together with a few embryologic illustrations.

W. H. C.

Kraupa, Ernst. **Glassblower's cataract.** Arch. f. Augenh., 1928, v. 98, Feb., p. 85.

(See also book review, A.J.O., May, p. 402.)

It is impossible to abstract the above article of one hundred and twelve pages. Kraupa first reviews all the available literature on glassblower's cataract. Next, he discusses the clinical aspect, which is divided into, (1) general examination technique, (2) clouding of the lens in nonprofessional cases, (3) professional polar cataract, (4) glassblower's cataract, (5) destructive action of heat in the lens capsule, (6) cataract extraction in glassblower's cataract. The statistics of glassblower's cataract are next given, followed by a chapter in etiology and pathogenesis. The prevention of this type of industrial cataract is then outlined, and the industrial medical aspect discussed.

Kraupa feels that this type of cataract should not be classed as permanent, total, or partial disability. Following the extraction of the cataract and the prescribing of proper lenses, the worker is once more able to follow his usual occupation without a handicap. This applies particularly where both eyes have been operated upon.

Frederick C. Cordes.

10. RETINA AND VITREOUS

Butler, T. Harrison. **Opticociliary veins on the papilla.** Brit. Jour. Ophth., v. 12, p. 320, June, 1928.

In the left eye of a man aged twenty-three years, the reporter observed that the vessels arose eccentrically from the nasal edge of the cup. From this site sprang two large veins which ran across the disc toward its temporal side, where they ended blindly, dipping down into the choroid. A faint trace could be followed just beyond the edge of the papilla, but almost immediately the vessel was lost to sight, presumably joining the choroidal circulation. Vision was normal. The right eye showed a large patch of choroidal atrophy above the macula, probably the result of intrauterine choroiditis.

D. F. Harbridge.

Heine, L. **Arterial occlusion.** Arch. f. Augenh., 1928, v. 99, May, p. 116.

Heine classifies the causes of arterial occlusion as (1) trauma (foreign body, contusion, operation), (2) chorioretinitis, (3) glaucoma, (4) retrobulbar neuritis, (5) arteriosclerosis and nephritis (either partial or total), (6) septic emboli, (7) air emboli. There are numerous excellent fundus pictures illustrating these conditions. Heine emphasizes the necessity of careful routine fundus examination, particularly as to the blood vessels. Small changes noted in the blood vessels are often the first indication of a retinal, cerebral, or generalized arteriosclerosis. A careful field often shows a quadrant or sector-like defect, usually with the apex pointing toward the blind spot. These may be relative or absolute, and at times are only for definite colors.

Frederick C. Cordes.

Houwer, A. M. **Thrombosis of the carotid artery with orbital complications.** Arch. f. Augenh., 1928, v. 99, May, p. 240.

Houwer reports a case of nephritis with thrombosis of the carotid artery. Blindness was produced by embolus of the central retinal artery, complicated by multiple emboli in the ciliary arteries and in the eye muscles. In the choroid was a hemorrhagic infarct. Death followed five days after the onset of the eye complications.

Frederick C. Cordes.

James, R. R. **Massive retinal hemorrhage.** Brit. Jour. Ophth., v. 12, p. 313, June, 1928.

This is the record of two cases of

retinitis proliferans. In each instance the condition was bilateral and followed massive hemorrhage. A male aged twenty-five years, syphilitic, presented a large hemorrhage overlying the disc. Five or six years later great proliferation of connective tissue was present. V=6/60 and 6/6. While there was no definite proof that the arsenical preparations used previous to coming under observation had any deleterious effect, yet the condition rapidly responded to the older method of mercury and iodides.

The second case was in a female aged twenty-two years. The only evidence of possible congenital syphilis was suspicious peg teeth, but Wassermann was negative. In contrast with the former case the hemorrhages were in the periphery of the fundi. Under tuberculin the vitreous cleared and vision of 6/6 and 6/9 respectively was finally obtained. Five illustrations accompany the contribution.

D. F. Harbridge.

Kerry, Richard. **Iodine in chorioretinal edema.** Brit. Jour. Ophth., 1928, v. 12, May, p. 246.

The amount of fluid present in the eye in many cases of retinal detachment is much larger than one would expect that the relatively few retinal capillaries could furnish, and, since the choriocapillaris is the only other probable source of the fluid, one naturally concludes that the objective signs present in this condition are due to choroidal trauma, direct or infective. Measures to promote absorption of fluid and at the same time to terminate causal inflammation are indicated. There is no more powerful stimulant to cellular metabolism than iodine. The writer reports three recent cases of chorioretinal edema in which encouraging results were obtained by the use of this remedy. Two were the result of trauma and the third gave a history of rheumatism and dental sepsis. The preparation used was a solution of iodine in sesame oil (1 in 40). Fifteen minims were given hypodermically, twice during the first week, then once a week. The injection must be carried well through the skin but not necessarily intramuscularly. Caution is advised in the use of the remedy in tuberculous patients.

D. F. Harbridge.

Spanglung, Herbert. **The end stages of periphlebitis retinalis.** Zeit. für Augenh., 1926, Nov., v. 60, p. 272.

This is a detailed histological description of the end result of the healing of the perivascular inflammatory process first described by Fleischer as a true vascular tuberculosis.

F. H. Haessler.

Villard, H., and Dejean, C. **Thrombosis of central retinal artery.** Ann. d'Ocul., 1928, v. 165, April, pp. 241-247.

A woman of seventy-one years with arteriosclerosis and hypertension noted frequent periods of obscuration of vision in one eye. These became more and more frequent, ending in blindness in three months. The ophthalmoscopic examination showed an ischemia of the retinal vessels. Shortly after the blindness an acute glaucoma supervened and enucleation was performed. Sections of the eyeball and nerve showed a thrombosis of the central artery of the retina which had its origin apparently in an ulcer of the wall of the vessel. Of interest was the persistence of a very slight degree of vision for a long time, and the absence of cherry-red macular spot and of retinal edema.

L. T. P.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Graff, C., and Mikulinska, J. **Partial edema of the optic papilla with simultaneous partial atrophy.** Arch. d'Opht., 1928, v. 45, p. 298.

A girl eighteen years old complained of double vision. There was exophthalmos of the left eye with diminution of visual acuity and fields. To the ophthalmoscope the veins were markedly congested and tortuous. The phic upper half of the disc. Upon its borders only slightly blurred. It was not raised above the retina, in con-

trast to the lower half of the disc, which was elevated three diopters. There was an abrupt demarcation between the swollen lower half and atrophic upper half of the disc. Upon enucleation a fibrosarcoma of the lower portion of the orbit involving the optic nerve was found. Microscopic examination showed atrophy of the upper portion of the disc and papilledema of the lower portion. From the presence of enlarged vessels, vacuoles, and glial proliferation in the atrophic portion of the nerve, it was concluded that papilledema had been present in this portion of the nerve before atrophy set in. *M. F. Weymann.*

Terrien, F., Renard, F., and Dollfus, M. A. **Stasis of the papilla and serous ependymitis.** Arch. d'Opht., 1928, v. 45, May, p. 288.

Observations upon two patients with symptoms of increased intracranial pressure are given. Neither showed any signs of syphilis and the Wassermann reactions were negative. The first patient had severe headache with vomiting but the vision and fields remained normal. The discs showed papilledema with no hemorrhages. The second patient had diminished vision and paresis of the left external rectus muscle in addition to the above findings. In both cases the spinal fluid pressure was above normal. Repeated spinal puncture with mercury and arsenic therapy gave complete recovery from symptoms. The cause of the symptoms was regarded as serous ependymitis of a possibly infectious origin. Even though the patients responded to antisyphilitic treatment, it was thought that the infection was not specific, because of negative serum reactions and the absence of physical signs. *M. F. Weymann.*

White, L. E. **The location of the focus in optic nerve disturbances from infection.** Ann. of Otol., Rhin., and Laryng., 1928, March, p. 128.

That the teeth and tonsils are the site of the foci of infection in optic nerve disturbances in over eighty per cent of the thirty cases analyzed is the chief point of interest. A plea for more conservative surgery in regard to the sphenoid and ethmoid sinuses is sounded. Various possible foci are reported, but the accessory sinuses supply but an insignificant number. The author believes invasion is through the blood stream. *D. H. O'Rourke.*

NEWS ITEMS

News items in this issue were received from Drs. Arthur J. Bedell, Albany; H. Alexander Brown, San Francisco; C. A. Clapp, Baltimore; W. Holbrook Lowell, Boston, and C. W. Rutherford, Indianapolis. News items should reach **Dr. Melville Black,** Metropolitan building, Denver, by the twelfth of the month.

Deaths

Dr. Myles Standish, Boston, died June 26th, 1928, at the age of seventy-six years (see page 659).

Dr. Vincent Brown died suddenly, in San Francisco, on June 25th.

Dr. Leon Edward White, Boston, aged sixty, died May 18th.

Dr. Walter Forchheimer, Cincinnati, aged sixty-two, died May 22nd, of cerebral hemorrhage.

Dr. Frank A. Morrison, Indianapolis, aged sixty-eight, died June 7th, of cerebral hemorrhage.

An obituary concerning Félix Legrange will be found on page 658.

Marc Landolt, one of the most distinguished of the younger French ophthalmologists, died of syncope while swimming to the shore of the river Seine from a sailboat which had capsized.

Dr. John C. Bossidy, formerly of Boston but who for the last few years had been practicing in Lee, Massachusetts, died on July 8th in Saint Luke's Hospital, Pittsfield, Massachusetts, a victim of septic sore throat which he had contracted while attending patients during an epidemic.

Miscellaneous

At the fifty-second commencement exercises of Johns Hopkins University, June 12th, an anonymous gift of $100,000 to be used for the Wilmer Eye Clinic was announced.

The Hon. Edward T. Taylor, Congress-

man from Colorado, succeeded in passing through Congress a bill changing the name of the Ancon Hospital in the Panama Canal Zone to the General Gorgas Hospital, as a small recognition of the wonderful work of General Gorgas in sanitation.

At the St. Louis meeting of the **American Academy of Ophthalmology and Otolaryngology,** October 15th to 19th, the convention headquarters will be Hotel Statler. Dr. Edward Jackson of Denver will be the guest of honor. A very elaborate golf program has been arranged for Monday. Dr. Alden of St. Louis is chairman of that committee. Tuesday morning—aside from the addresses by the president and the guest of honor—a symposium will be presented upon "recent developments in neurology as it applies to the eye, ear, nose and throat." "Visual pathways" will be presented by Dr. James F. McDonald, professor of physiology, Creighton Medical College, Omaha; "Ear" by Dr. Lewis Fisher, Philadelphia; "Nose and Throat" by Dr. Robert Levy, Denver; "Correlation" by Dr. Ernest Sachs, St. Louis. Thirteen papers have been selected for presentation during the Otolaryngological Section, Tuesday and Thursday afternoons. Thirteen papers have also been selected for presentation during the Ophthalmological Section, Wednesday and Friday afternoons. A very elaborate instructional program will be given Wednesday, Thursday, and Friday mornings, in much the same way as at Detroit last year. Twenty-six private rooms have been engaged at the hotel for this purpose. The annual banquet will be given Tuesday night, and the business meeting will be held Wednesday night. Thursday night is left open for special dinners (several of which have been arranged for). A well planned program has been formulated for entertainment of the ladies. Railroad arrangements will be announced shortly. (Information kindly furnished by Dr. W. P. Wherry, secretary.)

The American Board for Ophthalmic Examinations and the American Board of Otolaryngology will hold examinations in Saint Louis, Missouri, on Monday, October 15, 1928, this being in the week of the annual meeting of the American Academy of Ophthalmology and Otolaryngology. Those desiring to come before either board should communicate with Dr. W. H. Wilder, 122 South Michigan Boulevard, Chicago, Illinois (as to the ophthalmic board) or Dr. W. P. Wherry, 1500 Medical Arts Building, Omaha, Nebraska (as to the otolaryngological board). The American Board of Otolaryngology will hold an additional examination in New York City on Friday, October 12th.

The Second International Conference on Light and Heat in Medicine, Surgery, and Public Health will be held in London from October 29 to November 1, 1928.

Personals

Dr. Harry Friedenwald and daughter, of Baltimore, have sailed for a vacation in Spain.

Dr. W. H. Wilmer was elected president of the Johns Hopkins Medical Society at its May meeting.

Dr. Alan Woods, of Baltimore, recently broadcasted under the auspices of the committee on public instruction over WCAO.

Drs. W. M. Carpenter, G. Heidelman, H. C. Knapp, and W. Rowland were elected as additional house officers of the Wilmer Institute.

Dr. Robert E. Sullivan of Nashville, Tennessee, has been appointed assistant professor of ophthalmology and otolaryngology in the Vanderbilt University Medical School.

Dr. Robert J. Masters, Indianapolis, has been appointed secretary-treasurer of the Indiana Academy of Ophthalmology and Otolaryngology, to cover the vacancy created by the removal of Dr. C. W. Rutherford to Iowa City.

Dr. George W. Swift has moved his offices from the Seattle Eye, Ear, Nose and Throat Infirmary to the Neurosurgical Clinic, 902 Boren Avenue, Seattle. Dr. Swift has discontinued the practice of ophthalmology and is now limiting his practice to surgery of the brain and spinal cord.

Dr. and Mrs. C. A. Ringle of Greeley, Colorado, left during the latter part of June for the international otolaryngological meeting in Copenhagen.

Dr. Adolph O. Pfingst has resigned as clinical professor of ophthalmology at the University of Louisville and as director of the eye clinic at the City Hospital.

Dr. L. Webster Fox, of Philadelphia, published in the June "Outlook for the Blind" an address delivered during Philadelphia Educational Week for the Blind, entitled "The physician's relation to the blind."

At the last meeting of the American Medical Association, held in Minneapolis, Dr. Arthur J. Bedell was awarded the silver medal, given by the Committee of Awards in the Scientific Exhibit, for his demonstration and display of stereophotographs of the living lens, also stereophotographs of the fundus oculi in living patients.

In the week from July 16 to 20 inclusive, Dr. J. M. Wheeler of New York delivered a series of lectures on ophthalmology in Seattle under the auspices of the extension department of the University of Washington, these lectures forming a part of the twelfth annual postgraduate medical course of the university.

Numerous facts with regard to a baby's eyes are discussed by Dr. Park Lewis of Buffalo in a recent article on "How sight came," in Hospital Topics, published by the Millard Fillmore Hospital of Buffalo.